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SAFETY STATUS DATA COLLECTION METHODOLOGY

Volume I. Summary Report

by

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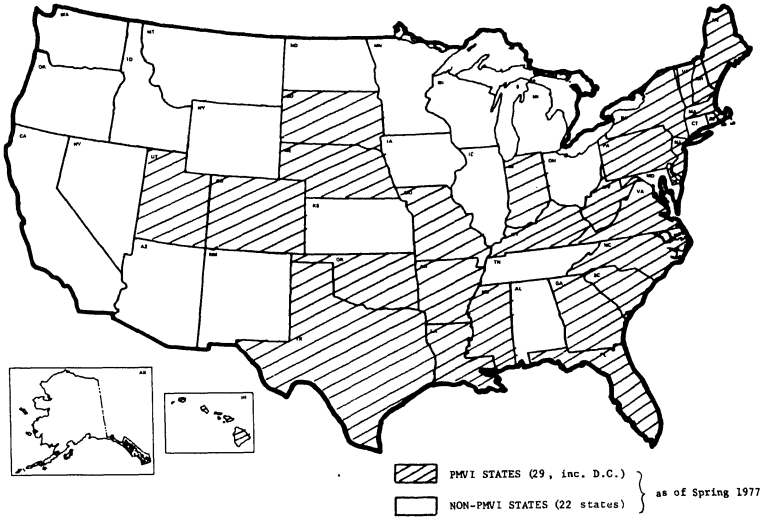
ABSTRACT

There were two principal objectives of this contract. The first was to develop data collection and data analysis procedures to permit the measurement and evaluation of existing state motor vehicle inspection programs. Only passenger cars were considered. A limited field test was conducted in St. Louis, Missouri, to validate the procedures. The second objective was to design an experiment which relates the presence of a federally recommended PMVI system to accident, fatality, injury, and property damage level. The experiment considered exogenous variables (topography, demographics, driver habits, etc.) and control variables (statistical similarity of two groups) as well as the principal comparison of interest—PMVI versus no PMVI.

1.0 INTRODUCTION

1.1 Background

Periodic motor vehicle inspection (PMVI) has been around for a long time. Pennsylvania in 1929 was



the first state to adopt statewide inspection of safety components on all passenger cars. The number of states with PMVI is constantly changing, and the figure now stands at twenty-nine, including the District of Columbia (Figure 1–1). The figure was at 32, but in the last six months Idaho, New Mexico, and Wyoming have suspended their programs. The frequency of inspection varies from every six months in six states to annual inspection in the others. Several more states require a vehicle inspection only at time of title-transfer from one owner to another.

The bulk of the states license private garages to conduct the required inspections. These garages, called inspection stations, are then periodically checked by the licensing authority for general appearance and operation and for such supply needs as inspection forms and sticker decals. The states of Delaware and New Jersey and the District of Columbia maintain state-owned and operated lanes in which all vehicle inspections are conducted.

The underlying assumptions of PMVI are:

(1) Vehicle defects contribute to the cause of traffic accidents, and

(2) Periodic vehicle inspection has the effect of eliminating defective cars from the roads (and therefore of reducing traffic accidents).

The difficulty has always been in "proving" these assumptions. The fundamental problem is that a PMVI system is just one of many factors which affects vehicle condition (Figure 1-2). It is inherently difficult to assess the performance of an inspection system given the uncertainty and degree to which the exogenous factors interact and, in effect, mask the influence of inspection. In addition, the information[1] on defect-caused accidents suggests that the figure may range from 5 percent (certain cause) to 25 percent (certain, probable, and possible causes).[2] Therefore, the problems of separating the impact of PMVI on vehicle condition from other factors and of looking for a relatively small accident-caused effect make the "proof" of PMVI difficult to establish.

[1] *A Study to Determine the Relationship Between Vehicle Defects and Failure, and Vehicle Crashes.* Indiana University, Institute for Research in Public Safety. May 1973. Available from National Technical Information Service, 5285 Port Royal Road, Springfield, Va. 22161. Order PB-221 976, $9.25 (Volume I). Order PB-221 977, $6.00 (Volume II).

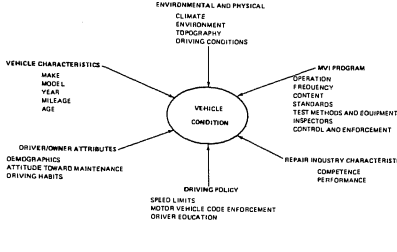


FIGURE 1-2 IMPACTS ON VEHICLE CONDITION

The present contract[3] addressed both the PMVI assumptions to varying degrees. The first objective was to develop inspection program evaluation procedures which can be used by state and federal officials to measure the effectiveness of PMVI systems in reducing the vehicle defect level below that which would exist in the absence of state inspection. In effect, this objective was aimed at determining the strength of the second assumption as related only to vehicle defects.

The second objective of the contract was to design an experiment which relates the presence of a federally recommended PMVI system to accidents, fatalities, injuries, and property damage. By inspecting two groups of vehicles to different vehicle-in-use standards, a direct comparison in terms of accident experience can be made to assess the effect of vehicle condition on accident involvement. The intent of this objective was to propose an experiment by which the first assumption could be tested.

1.2 Program Overview

The original contract consisted of four tasks. Task 1 was the preparation of the plan of work and methodology. Task 2 was the development of data collection and data analysis procedures for use by state and federal officials to determine the effectiveness of vehicle inspection. Since 28 states, the District of Columbia, and the Commonwealth of Puerto Rico have some form of periodic inspection, the focus of the work was on the development of evaluation procedures for PMVI states. However, the procedures that were developed are also applicable to title-transfer-only inspection states.

The procedures consist of both field and inspection stringency measures. Field evaluations involve the measurement and assessment of vehicle defect condi-

since inspection. Inspection stringency evaluations involve the assessment of the operational condition and performance of state-approved inspection stations.

The procedures were then validated both analytically and operationally. This constituted Task 3. Task 4 was the effort to design an experiment which relates accident involvement to periodic inspection.

A contract modification was executed and two additional tasks were identified. The first contract modification task called for an extension of the evaluation procedures already underway as original contract Tasks 2 and 3. The work on this extension task is not singled out separately, but is included in the general presentation of evaluation procedures. The second contract modification task was an update of the NHTSA[4] motor vehicle identification code, called the Ultra Code.

1.3 General Accomplishments

The principal accomplishment was the preparation and publication of the Motor Vehicle Inspection Program Evaluation Procedures Manual and the documentation covering computer program development and use. As the basis of the development of these procedures, an extensive field validation program was conducted in Missouri. The validation effort successfully demonstrated the application of technique and the cooperation of a cognizant state authority.

The other significant accomplishment was the generation of an experiment design for the assessment of the impact of PMVI on accident involvement. The proposed design, if implemented, would provide the data by which the link between vehicle condition and accident frequency could be quantified.

2.0 INSPECTION PROGRAM EVALUATION PROCEDURES

To evaluate the effectiveness of a state motor vehicle inspection system, the vehicle-in-use (VIU) condition of passenger cars and the operational condition and performance of appointed garages or licensed facilities must be determined. The VIU condition assessment is called field evaluation: the inspection station assessment is termed inspection stringency evaluation.

2.1 Field Evaluations

Field evaluations require determining the VIU condition of passenger cars as a function of time since last required inspection. The key dimension here is time since inspection. For PMVI states, this means the number of months since last regular inspection. For title-transfer-only inspection states, time since inspection means months since title transfer if dealing with used cars. One-owner cars in title-transfer-only states have never been inspected by the state system, and the time dimension refers to the age of the car.

2.1.1 Data Analysis Methodology

The analysis methodology begins with the viewpoint that an absolute measure of the effectiveness of a PMVI system must compare the average safety status of the affected motor vehicles under the program with that which would exist if there were no such program. This approach is expressed in the defined measure of effectiveness (MOE) in which a direct comparison of vehicle defect condition with inspection is made with the condition in the absence of inspection.

$$MOE = 1 - P_I/P_N$$

where P_I = time average probability of a defective vehicle in the vehicle population with PMVI,

P_N = probability of a defective vehicle in the vehicle population with no PMVI.

The measure is on a scale of 0 to 1. A PMVI system will have zero effectiveness if $P_I = P_N$, and it will have unit effectiveness if $P_I = 0$.

By their very nature, the required probabilities P_I and P_N can never be measured in the same state at the same time. If a state has PMVI, P_I can be measured directly and P_N cannot be measured. The opposite is true of a state without PMVI. Thus, it is necessary to introduce some rational method of extrapolating from the existing situation to a postulated different situation.

This requirement is met by use of a *model* to represent the statistical dynamics of the wear-inspect-repair process for automotive subsystems. There are four important elements which this model must capture, namely,

1. Development of vehicle defects;
2. Retirement of vehicles due to age or accidents;
3. Detection of defects and correction by vehicle owners; and
4. Detection of defects via periodic inspection and their subsequent forced correction, including the tendency of inspectors to pass a defective item.

The model defines the time history of the probability of the occurrence of a defect in the period following inspection in terms of the natural parameters which

[4] National Highway Traffic Safety Administration.

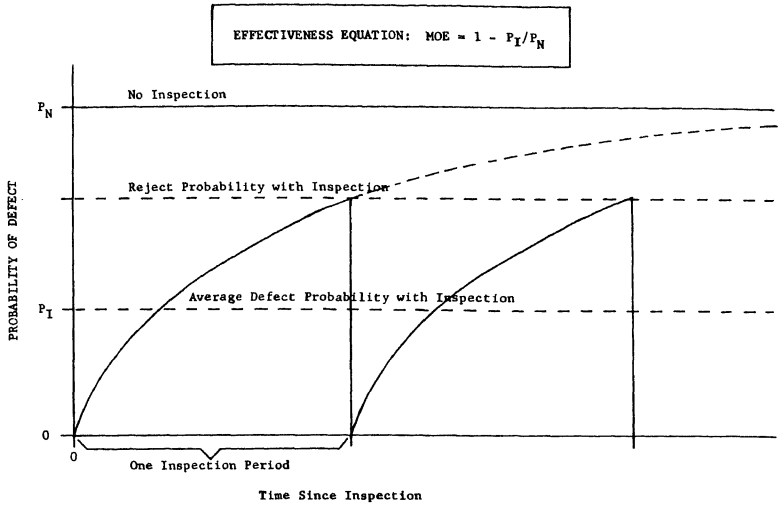


FIGURE 2-1 ILLUSTRATION OF DEFECT - TIME SINCE INSPECTION CURVE

characterize these elements. Given values for the parameters which specify the model in any given situation, the model then defines P_I, the average of the function over the inspection interval; and P_N, the asymptotic value of the function long after inspection. Best-fit parameter values are obtained using standard parameter estimation techniques.

Conceptually a defect-time curve is shown in Figure 2–1. Illustrated is the fraction of cars out of the total population which have defects as a function of time since last state inspection. The curve rises with time since inspection because VIU condition deteriorates the further in time the vehicle is from last state inspection. In other words, state inspection has the effect of removing defective vehicles (components) from the road at or about the time of inspection. The average VIU condition over one inspection period is represented by P_I, and an extrapolation of the defect-time curve to a steady-state value (no inspection case) is represented by P_N.

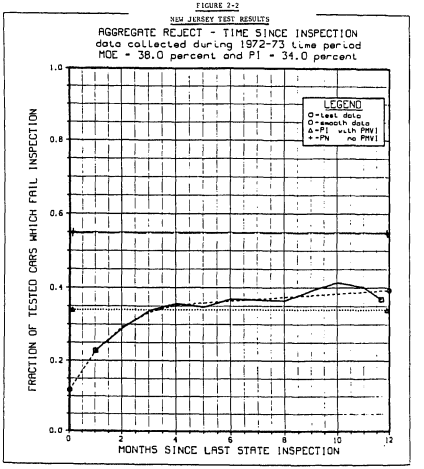
The MOE is computed for component groupings and

2.1.2 Analytical Validation

To demonstrate the data analysis procedures, a MOE calculation was performed using data obtained from the State of New Jersey.[5] These data were taken during 1972–1973 as part of a research effort. More than 20,000 randomly selected vehicles were inspected at varying times since inspection using a mobile inspection station. These vehicle inspections were performed in addition to the regular New Jersey inspections which are required of all motorists once per year in the state-owned and operated test lanes.

Table 2–1 illustrates the numerical calculations and error analysis which support the computation of

[5] These data in the form of punch computer cards were furnished to Avco by Robert McMinn, Deputy Director of the Division of Motor Vehicles, State of New Jersey, in the summer of 1975. Mr. McMinn has reported on this test program on several occasions over the past few years. The new element here is the use of data analysis-curve fit procedures to estimate the relative effectiveness of the PMVI system to reduce defects



measure of effectiveness. Figure 2–2 graphically depicts the aggregate reject time since inspection result. For the aggregate process, the measure of effectiveness is computed to be 0.380 ± 0.067 (one-sigma). That is, the defect rate (average over the 12 months between inspections) with inspection is 34.0 percent, and without inspection the defect rate would be 54.8 percent.

2.1.3 Data Collection Methodology

The purpose of the field evaluation is to provide an accurate estimate of the average effectiveness of the inspection program in improving the safety condition of in-use vehicles. The sampling plan is designed to aid in performing this evaluation by (1) ensuring that the results are representative of the entire state and (2) reducing the quantity of data collection required. The plan provides for the selection of sites within the state under evaluation and ensures that the combined sample for all sites does fulfill the requirement of being representative by stratified sampling at each site and testing for biases in the sample when the underlying distributions are known.

2.1.3.1 Site Selection Procedures

The general areas or sites within a state are selected using a stratified cluster sampling which stratifies on income considerations. The control or sampling variables are:

1. Population size and residence character (city size),
2. Income level, and
3. Geographical location.

This is a three-step selection process in which the 1970 Census[6] is reference for steps 1 and 2, and the judgment of state officials is the reference for step 3.

Sites are apportioned among city size groupings (urban, suburban, and rural) based on the contribution of each group to the total population (percent sample). Within each group, places are selected on the basis of population, match of income to that of the state, and geographical location requirements.

2.1.3.2 Particular Site Selection

The next step is to select the particular sites to be utilized. In principle, site selection should be in a middle-class neighborhood whose income distribution matches that of the general area and state. However, this selection process also depends on what is available for test location and what is allowable from the police cooperation/authority standpoint. Compromises may have to be made, particularly as a site is selected within an urban grouping. The effect of these compromises cannot be gauged and may not be important since the random selection of vehicles draws motorists from different areas of the city.

2.1.3.3 Vehicle Test Method and Selection Technique

Field evaluations require the use of the defect model from which the measure of effectiveness of a given system is computed. The prime input to the defect model is the history of defect probability as a function of time since inspection for the sampled vehicle population. After an extensive evaluation among candidate vehicle selection techniques (random roadside, police solicitation, company employee cars, telephone solicitation) a combination random roadside and police solicitation was selected. The vehicles will undergo inspection using a mobile van unit or garage dedicated to this purpose.

2.1.3.4 Vehicle Sampling

Vehicle sampling is concerned with acquiring passenger cars with a representative mix of make, model

[6] U.S. Department of Commerce, Bureau of Census, 1970

TEST CASE--AGGREGATE NEW JERSEY ANALYSIS

OBSERVED DATA

Months →	TIME	ALL	1.00	2.00	3.00	4.00	5.00	6.00	7.00	8.00	9.00	10.00	11.00	11.67
Reject →	STATE 1	5497	323	340	419	446	476	475	447	435	471	495	444	726
	STATE 2	10159	1098	838	824	822	894	810	772	760	733	700	662	1246
Pass →	TOTAL	15656	1421	1178	1243	1268	1370	1285	1219	1195	1204	1195	1106	1972

INFERRED RESULTS

PARAMETER ITERATION CONVERGED. BEST FIT= 10067.43

ITERATION SUMMARY

	STEPS	DIVERGENCES
NEWTON-RAPHSON	13	0
GRADIENT	0	0
TOTAL	14	0

P_O

PARAMETER VALUES=

f → 0.22092 0.94324 4.3920 0.20609 ← t_{max} ← ϵ_2

COVARIANCE OF PARAMETER ESTIMATES

0.25756D-02			
0.18150D-03	0.46961D-03		
-0.55109D-01	0.44812D-02	0.13562D 01	
-0.44488D-02	-0.20373D-03	0.92927D-01	0.91411D-02

PROBABILITIES VERSUS TIME FROM INSPECTION. STATES 1 THRU 2 (1 → Reject, 2 → Pass)

Months →	P_U →		
0	0.11768	0.88232	
1	0.22631	0.77369	
2	0.29278	0.70722	
3	0.33235	0.66765	
4	0.35230	0.64770	
5	0.35871	0.64129	
6	0.36383	0.63617	
7	0.36886	0.63114	
8	0.37382	0.62618	
9	0.37870	0.62130	
10	0.38350	0.61650	
11	0.38823	0.61177	
12	0.39289	0.60711	

AVERAGE PROBABILITIES WITH INSPECTION 0.33955 0.66045 ← P_I

EQUILIBRIUM PROBABILITIES WITHOUT INSPECTION 0.54751 0.45249 ← P_N

DERIVATIVE OF MOE WRT PARAMETERS =

-0.45649D 00 -0.18709D 01 -0.39403D-01 -0.32680D 00

SIGMA-MOE= 0.67474D-01

MOE → MOE= 0.380

CODE:

- f — Failures per month
- MOE — Measure of Effectiveness ($1 - P_I/P_N$)
- P_I — Probability of defect with PMVI
- P_N — Probability of defect without PMVI
- P_O — Probability of owner repair
- P_U — Probability of undetected defect after inspection
- t_{max} — Time scale for owner repair
- ϵ_2 — Probability of inspection pass for a defective vehicle

TABLE 2-1
MOE COMPUTATION FOR NEW JERSEY

(make and model year) for the state and the area in which the evaluation will be conducted is first established using R. L. Polk[7] data.

Using a random roadside/police solicitation vehicle selection technique, vehicles are sampled according to the pre-design make and model year profiles. Time since inspection is also used as a basis for selecting vehicles. It will probably be necessary to aggregate vehicle profiles as far as the vehicle selection process is concerned. For example, vehicle make profiles could be broken into five classes (AMC, Chrysler, Ford, GM, and import products), and vehicle model years into three categories (new, middle-aged, and vintage).

2.1.4 Data Collection Requirements

The data collected in the field include inspection outcome (numerical or subjective) and the particulars of the examined vehicle (make, model year, time since inspection). This information is required for the outage model and is consistent with the vehicle sampling procedures. The two remaining issues are what items to inspect and to what standard, and how many vehicles to inspect.

A comprehensive list of inspection items is presented in Table 2–2. The items inspected in Missouri, the standards to which they inspect these items, and the test procedures are shown in columns 2 and 3 of Table 2–2. The fourth column indicates the federal VIU standards. The Missouri inspection list is used as a reference because it is typical of the scope of inspections performed by a wheel-pull state. On the other hand, the federal VIU standards are presented as reflective of NHTSA thinking.

The criteria and scoring are also shown in Table 2–2, along with the recommendation for those items which should be inspected. The principal criteria in making the final judgments are the safety criticality factors (failure criticality and frequency of outage). The application of these criteria for each inspection item is based on a review of the Indiana[8] and MVIEP[9] results and consultation with technical experts.

[7] R. L. Polk & Company, Motor Statistical Division.

[8] *A Study to Determine the Relationship Between Vehicle Defects and Failure, and Vehicle Crashes.* Indiana University, Institute for Research in Public Safety. May 1973. Available from National Technical Information Service, 5285 Port Royal Road, Springfield, Va. 22161. Order PB–221 976, $9.25 (Volume I). Order PB–221 977, $6.00 (Volume II).

[9] Motor Vehicle Inspection Evaluation Project (MVIEP), DOT–HS 093–2433.

An evaluation state would take the recommended inspection list (last column, Table 2–2), compare it with the inspection items called out in its own inspection program, and retain those items common to both. The test procedures and standards would be the same as used by the regular inspection stations. The objective is to evaluate the effectiveness of the system to suppress defects by inspection. Clearly, if a state does not inspect an item, there is not an inspected versus non-inspected condition and the MOE for that component is zero.

To estimate sample size requirements, a Monte Carlo computer program was executed to test the effect of different characteristics of the system under evaluation. For example, the sample size requirements to prove that the PMVI system has non-zero effectiveness for at least one inspection item are quite small. On the other hand, the sample size requirements to "prove" that a system is 55 percent effective, rather than 60 percent effective, are somewhat larger.

Results from the Monte Carlo analysis show that sample sizes in excess of 10,000 are required to depress the error in the MOE below 0.01, but that sample sizes of about 400 yield accuracies of better than 0.1. A sample size of 600 vehicle inspections for each homogeneous test area should be adequate.

2.2 Inspection Stringency Evaluations

The quality of inspection, as performed by appointed garages or licensed facilities, is a major determinant of the mechanical condition of vehicles on the roads today. In an effort to assess directly the quality of inspection, two types of inspection stringency evaluations were developed.

1. *Administrative Procedures Evaluation*—Evaluation of appointed garages or licensed facilities in complying to state administrative rules and regulations governing inspection station operation.
2. *Test Procedures Evaluation*—Evaluation of appointed garages in complying with state test procedures governing the inspection of passenger cars at licensed inspection stations.

Inspection station visits are apportioned to the urban, suburban, and rural groupings in approximately the same proportion as they exist in the underlying population. For example, if urban population centers dominate in the ratio of 2 to 1 compared to suburban and rural groupings, respectively, then the number of stations visited in the city areas should equal the total

TABLE 2-2
CANDIDATE VEHICLE INSPECTION LIST

INSPECTION ITEM	MISSOURI STANDARD	MISSOURI TEST EQUIPMENT/ PROCEDURE	FEDERAL VIU STANDARD	FAILURE CRITICALITY	FREQUENCY OF OCCURRENCE	PRECISION OF INSPECTION	UTILITY OF EMPLOYING SIMPLE TEST EQUIPMENT	INSPECTIONS PER UNIT TIME	COMMONALITY AMONG STATES	RECOMMENDED TEST LIST
1.0 TIRES AND WHEELS										
1.1 Tread Depth	No tread across middle half of tire tread, no tread across either the inner or outer half of tire tread at three equally spaced locations around the circumference	Visual	2/32-inch - Visual check for tread indicators in 2 adjacent grooves at 3 equally spaced locations around the circumference	H	H	M	H	H	H	Yes
1.2 Tire Pressure	– –	– –	– –	H	H	H	H	M	L	No
1.3 Tire Type	Mismatch of bias, bias belted, or radial tires on same axle, and mismatch of dual tire sizes by more than ½-inch in height	Visual	Mismatch of size, construction, and profile on same axle	M	M	H	H	H	M	Yes
1.4 General Condition	Knots, cuts, separations	Visual	Clunking, bumps, knots, bulges	M	L	M	H	H	H	Yes
1.5 Tire Damage	Cord exposure	Visual	Visual check using awl if necessary for cord or belting material exposure	H	L	H	H	H	H	Yes
1.6 Tire Use	Improper or unauthorized use of a tire	Sidewall markings - visual	– –	M	L	H	H	H	L	No
1.7 Wheel Integrity	Cracks, elongated bolt holes, welding repair	Visual	Cracks, elongated bolt holes, welding repair	L	L	L	H	H	L	No
1.8 Wheel Deformation	– –	– –	3/32-inch runout in lateral and radial direction—use a runout indicator gauge	L	L	H	L	L	L	No
1.9 Wheel Mounting	Wheel bolts, nuts, lugs, and mismatch of wheel and hub assembly	Visual	Wheel nuts and bolts	M	L	M	M	M	L	No
2.0 STEERING, ALIGNMENT, AND SUSPENSION										
2.1 System Play	Steering Wheel Diam. (inches) / Lash or Free Play (inches) ≤ 18 / 2 > 18 / 3	Wheels on dry surface and in straight-ahead position, measure free movement. Engine on for power steering	Steering Wheel Diam. (inches) / Lash or Free Play (inches) 16 or less / 2¼ 18 / 2½ 20 / 2½ 22 / 2¾ Perform with engine on	M	M	H	M	L	M	Yes
2.2 Linkage Play				M	M	M	M	L	L	No
2.2.1 Front Wheel/Idler Arm Play	Wheel Diam. (inches) / Free Play (inches) ≤ 16 / 1/4 > 16 - ≤ 18 / 3/8 > 18 / 1/2	Free movement of a front tire - front end raised and ball joints are loaded	Free play in steering linkage as measured by the free movement of a front tire ¼-inch - front end is raised and ball joints are loaded							
2.2.2 Steering Linkage	Condition (pitman arm, stabilizer link, tie rods)	Excessive movement/tightness as measured by hand - front end raised and ball joints are loaded								
2.3 Free Turning	Binding or jamming	Turn steering wheel through full left-right turns. Engine on for power steering	Steering wheel shall turn freely	M	M	L	H	H	M	No
2.4 Alignment										
2.4.1 Scuff	30 feet per mile	Drive slowly over a side-slip indicator	30 feet per mile	L	H	M	M	M	M	Yes
2.4.2 Toe	Δ toe > 3/8 inch	Measure toe dimensions by a separate toe gauge or by a toe device which is part of an alignment machine	– –	L	H	H	M	M	L	Yes
2.5 Rear Wheel Tracking	Rear wheels track front wheels in straight-ahead position	Visual - not applicable for mismatched (front-rear) tires	– –	L	L	M	M	M	L	No
2.6 Power Steering				M	L	L	H	M	L	No
2.6.1 Belt/Belt Tension	Frayed or slipping belts	Visual	Cracked or slipping belts							
2.6.2 Fluid Level	Below manufacturer's minimum level	Visual	Insufficient fluid							

TABLE 2-2
CANDIDATE VEHICLE INSPECTION LIST (Continued)

INSPECTION ITEM	MISSOURI STANDARD	MISSOURI TEST EQUIPMENT/ PROCEDURE	FEDERAL VIU STANDARD	FAILURE CRITICALITY	FREQUENCY OF OUTAGE	PRECISION OF INSPECTION	UTILITY OF EMPLOYING SIMPLE TEST EQUIPMENT	INSPECTIONS PER UNIT TIME	COMMONALITY AMONG STATES	RECOMMENDED TEST LIST
2.6.3 Hoses/Connections	Leaks	Visual	– –							
2.6.4 Unit	Disconnected and no manual conversion, looseness or leaks	Visual	– –							
2.7 Ball Joint Seals	– –	– –	Cuts, cracks	L	L	L	H	M	L	No
2.8 Ball Joint Motion				M	M	M	M	L	M	No
2.8.1 With Wear indicator	Grease fitting boss is flush or inside cover surface	Load ball joints - visual check if boss is flush or inside								
2.8.2 Without Wear Indicator	Vertical and horizontal movement tables - VW's are exempt	Unload ball joints - use ball joint gauge for rejections and note defective part on MVI-2 form								
2.9 Control Arms	Structural damage	Visual	Structural damage	M	L	L	H	L	L	No
2.10 Pivot Shafts/Mounting	Worn or missing	Visual	– –	M	L	L	H	L	L	No
2.11 Rubber Bushings	Worn or missing	Visual	Cracked, extruded, or missing	M	L	L	H	L	L	No
2.12 Stabilizer Bars	– –	– –	Disconnected	M	L	L	H	L	L	No
2.13 Radius Rods	– –	– –	Missing, damaged	M	L	L	H	L	L	No
2.14 Springs	Broken leaves, torsion bar damage, spring shackles, bushings, and U-bolts	Visual	Springs shall not be broken or extended by spacers. Mountings, shackles, and U-bolts shall be secure	M	M	H	H	M	L	Yes
2.15 Shock absorbers	Worn or missing rubber bushings or mounting bolts. Missing, disconnected, or broken shock absorbers	Car on hoist or jack - visual check	Seal leakage, free rocking motion shall not exceed 2 cycles	M	M	L	H	M	M	Yes
3.0 BRAKES										
3.1 Warning Light	– –	– –	Function	L	L	H	H	M	L	No
3.2 System Integrity				H	L	M	L	L	H	No
3.2.1 Hydraulic	Hold brake pedal position without warning light coming on	Apply moderate force for 1 minute	125 pounds for 30 seconds							
3.2.2 Vacuum (Power Unit)	Pedal should fall slightly as engine is started, no audible leaks in vacuum system	Start engine with brake pedal depressed - auditory and visual	Hoses collapsed, abraded, broken, improperly mounted, or leaking audibly with engine on. With 25-pound force, pedal should fall slightly when engine is started							
3.3 Pedal Reserve	80% of travel	Apply moderate force	80% of travel, engine on for power assist system	M	L	L	M	M	M	No
3.4 Service Performance				H	H	L	L	L	H	No
3.4.1 Brake Force	See tables for portable decelerometer and platform tests. General stopping ability for substitute road test. 300 pounds brake force for dynamometer test	5 to 20 MPH for decelerometer road test, 4 to 8 MPH for platform test, 5 to 20 MPH for substitute road test, force range for dynamometer	Stop within 25 feet from 20 MPH road test							
3.4.2 Left-Right Equalization	25% force difference for platform test, 25 to 50 pound force difference for dynamometer test, vehicle pull for substitute road test	4 to 8 MPH for platform test, force range for dynamometer test, 5 to 20 MPH for substitute road test	20% force difference using brake tester, or stay within a 12-foot wide lane, 25 feet long, from a 20 MPH road test							
3.4.3 Front-Rear Equalization	25% force difference for platform test, 25 to 50 pound force difference for dynamometer test	4 to 8 MPH for platform test, force range for dynamometer test	– –							
3.5 Master Cylinder				M	H	L	H	M	M	Yes
3.5.1 Fluid	Leakage, fluid level ≥ 3/4-inch below top (≥ 1/4-inch for disc brakes and dual hydraulic systems)	Visual	– –							
3.5.2 Push Rod	No play	Pedal not depressed, visual	– –							

H - High L - Low M - Medium

TABLE 2-2
CANDIDATE VEHICLE INSPECTION LIST (Continued)

INSPECTION ITEM	MISSOURI STANDARD	MISSOURI TEST EQUIPMENT/ PROCEDURE	FEDERAL VIU STANDARD	FAILURE CRITICALITY	FREQUENCY OF FAILURE	PRECISION OF INSPECTION	UTILITY OF EMPLOYING SIMPLE TEST EQUIPMENT	INSPECTIONS PER UNIT TIME	COMMONALITY AMONG STATES	RECOMMENDED TEST LIST
3.6 Hoses	Leaks, cracks, chafings, restrictions, insecure attachments	Visual	Mounting interference, cracks, chafings, flattenings	H	L	L	H	L	M	Yes
3.7 Brake and Wheel Assembly				H	H	L	M	L	M	Yes
3.7.1 Wheel Cylinder	Leakage	Visual	– –							
3.7.2 Discs/Drums	External cracks, substantial cracks or wear on friction surface, surface contamination	Visual	Cracks, manufacturer's specifications for safe thickness dimension							
3.7.3 Bonded Linings										
– Thickness	1/32-inch	Measure at thinnest point	1/32-inch							
– Condition	Broken, cracked, loose, contaminated, improperly installed	Visual	Cracks, breaks, insecurely or improperly installed							
3.7.4 Riveted Linings										
– Thickness	1/64-inch over rivet head	Measure above rivet head at thinnest point	1/32-inch over rivet head							
– Condition	Loose or missing rivets; broken, cracked, loose, contaminated, improperly installed linings	Visual	Cracks, breaks, insecurely or improperly installed							
3.7.5 Wire-Backed Linings										
– Thickness	Wire visible	Visual	– –							
– Condition	Broken, cracked, loose, contaminated, improperly installed	Visual	– –							
3.7.6 Pads (Disc Brakes)										
– Thickness	1/32-inch	Measure	1/32-inch							
– Condition	Riveted pads worn to thickness of metal shoe	Visual	Cracks, breaks, insecurely or improperly installed							
3.7.7 Mechanical Linkage	Missing, broken, worn parts. Excessive friction in pedal and linkage or in brake components. Improper positioning or alignment of pedal levers	Visual	Improper assembly or installation of automatic adjusters or other parts							
3.7.8 Structural Parts	– –	– –	Deformation or cracking of backing plates and caliper assemblies. Broken, worn, ect. system parts							
3.7.9 Wheel Bearings	Looseness between brake disc/drum and backing plate or splash shield	Visual	– –							
3.8 Parking Brake	– –	– –	– –	L	L	L	H	M	M	No
4.0 LIGHTING AND ELECTRICAL										
4.1 Headlamps										
4.1.1 Function	On-off	Visual	– –	L	M	M	M	M	H	Yes
4.1.2 Aim	– –	– –	– –	L	H	M	M	M	M	No
4.2 Tail Lamps	Function and Condition	Visual	– –	M	M	H	M	M	H	Function only
4.3 Stop Lamps	Function and Condition	Visual	– –	M	M	H	M	M	H	Function only
4.4 Reflectors	Function and Condition	Visual	– –	M	M	L	M	M	M	Function only
4.5 High Beam Indicator	Function	Visual	– –	L	L	H	H	H	L	No
4.6 Turn Signals	Function	Visual	– –	M	M	H	H	M	M	Yes
4.7 Side Marker Lights	– –	– –	– –	L	M	H	H	M	M	Yes
4.8 Horn	Function	Auditory	– –	L	M	M	H	H	H	Yes
5.0 GLAZING, BODY, AND ENGINE										
5.1 Glazing	Condition (cloudiness, cracks, nicks, chips, obstructions, etc.)	Visual	– –	L	M	L	H	H	M	No

TABLE 2-3
CANDIDATE VEHICLE INSPECTION LIST (Concluded)

INSPECTION ITEM	MISSOURI STANDARD	MISSOURI TEST EQUIPMENT/ PROCEDURE	FEDERAL VIU STANDARD	FAILURE CRITICALITY	FREQUENCY OF OUTAGE	PRECISION OF INSPECTION	UTILITY OF EMPLOYING STATE'S EQUIPMENT	INSPECTIONS PER UNIT TIME	COMMONALITY AMONG STATES	RECOMMENDED TEST LIST
5.2 Driver's Window	Function (if no turn signals)	Visual	--	L	L	H	H	H	M	No
5.3 Windshield Wipers	Function and condition	Visual	--	L	M	H	H	H	H	Function only
5.4 Crankcase Ventilation				L	L	L	H	M	L	No
5.4.1 Plumbing Connections and Air Flow Routing	Function and condition	Engine off - visual	--							
5.4.2 Valve	Rattle when shaken	Disconnect crankcase ventilation valve, engine off - auditory	--							
5.4.3 Valve/Hose	Hissing noise or vacuum	Disconnect crankcase ventilation valve, engine on - auditory	--							
5.5 Air Injection System	Condition (belts, etc.)	Engine off - visual		L	M	M	H	M	L	No
5.6 Engine Modification Type	Condition (ignition wiring, vacuum hoses, etc.)									
6.0 VEHICLE INTERIOR										
6.1 Seat Belts (Front only)	Function and Condition	Visual	--	L	L	M	H	M	M	No
6.2 Rear View Mirror	Function and Condition	Visual	--	L	M	M	H	H	M	Function only
7.0 EXHAUST AND FUEL SYSTEMS										
7.1 Exhaust System	Condition, (manifold gasket, flange gasket, exhaust pipe, muffler, resonator, tail pipe, supporting hardware)	Engine on - visual	--	L	M	L	M	L	M	No
7.2 Fuel Tank	Condition (leakage, tank security, gas cap)	Visual	--	H	L	L	M	L	L	No

H - High L - Low M - Medium

of those visited throughout the rest of the state. For statistically significant results, approximately 100 station visits (total) should be made and apportioned to each region according to population proportion.

2.2.1 Administrative Procedures

Once the station visits have been apportioned, the next step is to select individual inspection stations within each target area. There would be merit in making a partially stratified sampling; i.e., in apportioning the sample to repair garages, gas stations, and dealerships in accordance with their population proportions and then making a random draw from within each. But investigation indicates that the distributional information identifying membership in these strata is not readily available by many of the states and would be costly to obtain. All the PMVI states were queried on this subject and the only ones which indicated they do keep distributional records are Kentucky, Oklahoma, Pennsylvania, South Carolina, South Dakota, and Utah. Accordingly, it is recommended that the stations be selected without regard to type of inspection facility.

The visits to inspection stations are done overtly, and at the same time as the regular visit by the official state field investigator. There is no need for covert observations, since only fixed or permanent conditions of operation are being assessed. By conducting these administrative visits with the official field investigator, the state assumes in large measure the expense of these visits and also adds a degree of authority to the effort.

A shopping list of administrative items to be tested in the field has been developed from an assessment of what is representative, what is common, and what is available. As a justification for the culling process, the administrative parameters for eight states—Georgia, Maryland, Missouri, Nebraska, New Hampshire, South Carolina, South Dakota, and Utah—were compared. These states run the gamut of inspection systems by covering wheel pull and non-wheel pull PMVI, and title-transfer-only states. A final list of administrative items (based on the criteria above plus the ability to judge these factors by a station visit) is shown in Table 2–3.

2.2.2 Test Procedures

An inspection stringency procedure is presented by which it is possible to assess the degree to which appointed garages follow prescribed test procedures. Are the appointed garages following performance inspection procedure relating to:

(1) Wheel(s) removal,
(2) Lamp inspection (front, rear, stop and turn signals),
(3) Horn and wiper checks,
(4) Underhood inspections,
(5) Alignment checks, and
(6) Brake performance tests?

This procedure is not a quantitative evaluation of the quality of inspection (i.e., error rate or the likelihood of an inspection pass given a defective subsystem). No programmed outages are introduced into candidate vehicles presented for inspection. Rather, this inspection stringency evaluation procedure is a direct check on the compliance of appointed garages in carrying out prescribed test procedures.

Once the inspection observations have been apportioned (subsection 2.1.3.1), the sampling procedure for the test procedure evaluations involves visiting in covert fashion different inspection stations for the purpose of determining the degree of compliance to prescribed test procedures.

To ensure a broad spectrum of inspection observation possibilities, implementation includes:

1. Combining observed and purchased inspections,
2. Checking stations over an entire day with drive-up and apointment inspections,
3. Using both male and female evaluators, and
4. Going to stations in rural, suburban, and urban settings.

Purchased inspections can be obtained by a drive-up (or queue) visitation procedure. The method is straight forward. A popular-model car is obtained and the evaluator presents the car for inspection at as many different inspection stations as possible during the day until the required number of stations has been checked. During any one day, a representative in a suitably licensed car should be able to purchase and observe directly eight inspections using a drive-up procedure, and three inspections for the queue inspection procedure.

The evaluator uses one of three possible reasons for presenting the car for inspection. First, the car may be due for inspection as shown by the inspection sticker. For this technique, the state authority must provide replacement windshield stickers. Second, the evaluator can state that the windshield has recently been replaced and, therefore, a new sticker is required. Finally, it may be stated that the car was recently registered from out-of-state; and that now, with new-state registration, a state inspection sticker is required.

TABLE 2-3
LIST OF ADMINISTRATIVE ITEMS

ITEM	REQUIREMENT
1.0 Facility	
1.1 Inside Area	
1.1.1 Length x Width	Full size, 4 wheel passenger vehicle, or 12 x 25 ft area.
1.1.2 Interior	Adequate lighting, heating, ventilation. Hard, level floor (not dirt, gravel, bituminous, sagging wood). Reasonably clean and clear work area.
1.1.3 Other Work	No other major repair work permitted for single bay stations.
1.1.4 Inspection Site	Inside station.
1.2 Hours of Operation	At least 8 continuous hours, 5 days per week.
1.3 Inspecting Personnel-Duty	At least 1 mechanic/inspector on duty (except for illness/vacation).
1.4 Documents	All current manuals, bulletins, and regulations must be on file.
1.5 Records	Up to date records must be maintained and available.
1.6 Interior Displays	
1.6.1 Station Permit	Framed under clear glass and displayed conspicuously.
1.6.2 Mechanic/Inspector Permit	Framed under clear glass and displayed conspicuously.
1.6.3 Inspection Rules	Framed under clear glass and displayed conspicuously.
1.7 Exterior Display	Public inspection station sign must be visible to motoring public
2.0 Equipment	
2.1 Brakes	
2.1.1 Brake Performance	Portable decelerometer, platform or roller type tester, or road test area
2.1.2 Lining Thickness	Gauge required
2.1.3 Pad Thickness	Gauge required
2.1.4 Pedal Reserve	1" and/or 2" pedal blocks
2.2 Tire Tread Depth	Gauge required
2.3 Steering/Alignment	
2.3.1 Scuff or Toe	Scuff or toe gauge required
2.4 Headlamp Aim	Mech. aim tester or screen
2.5 Other	
2.5.1 Vehicle Lift	Lift or jack required
2.5.2 Workbench	Required
2.5.3 Punch	1/8", 3/16" or 1/4" punch required
2.5.4 Scraper	Required
2.5.5 General Tools	Required
3.0 Sticker Books	
3.1 Supply	Adequate supply
3.2 Storage	Lockup for security
4.0 Inspector Forms	
4.1 Supply	Adequate supply
4.2 Storage	Lockup for security

The actual reason given may very well depend on the circumstances. For example, with two closely situated stations, the visit to the first station may involve an expired sticker while the return visit to the adjoining station may use the broken windshield story.

For the remote observation technique, the intent is to observe two inspections per day. Here, the success of the covert observation depends on the ability of the evaluator to conceal himself from discovery for parked car observations or to fashion a convincing tale which permits him to remain on the premises of the inspection station for an extended period up to six hours. The latter condition could arise if the evaluator arrives at the inspection garage with a sick car story; that is, car breakdown and must wait for arrival of new parts.

2.2.3 Data Analysis for Inspection Stringency Evaluations

Two figures of merit are defined for the inspection stringency evaluation procedures—compliance rate and correlation testing. Compliance rates are calculated for such categories of interest as region (urban, suburban, and rural); inspection station grouping (gas stations, dealers, general repairs, and chains and specialty); and inspection stringency grouping (administrative item groupings or test procedure items). In addition to the calculation of compliance rate, a statistical confidence interval on the estimate of compliance rate can be obtained for subtotals and aggregated groupings.

In addition to compliance rates and the statistical confidence that can be placed on these figures, there is the question of how independent or unlike the particular compliance rates are at the subgroup level. Is compliance rate insensitive to region, inspection station grouping, or inspection stringency grouping? To answer these questions, a chi-square test for independence is performed.

The calculation of compliance rate and the associated statistical confidence bands are direct performance measures of inspection stringency. The tests for correlation are indicators of conditions of exception for which specific and directed attention may be warranted.

3.0 VALIDATION PROCEDURES AND VALIDATION

The objective of the validation task was to validate the data collection and data analysis procedures. This tistical significance of results. Also of importance was the participation of a cognizant, cooperative motor vehicle inspection state. Both these conditions were met as the field and inspection stringency evaluation procedures were implemented on a limited basis in the State of Missouri. Missouri officials, particularly Captain C. W. Whitehead of the Missouri State Highway Patrol, were most cooperative in both the planning and conduct of the validation effort.

3.1 Field Evaluations

Validation of the field evaluation procedures was conducted during the month of September 1976. Safety inspections were performed on 666 Missouri-registered passenger vehicles. These inspections were performed in a closed, permanent (3-bay) facility located at the corner of Market and Jefferson Boulevards in the city of St. Louis. The 4-man inspection team was able to inspect 30 cars per day. A police officer was present to aid in the vehicle acquisition process, although it is estimated that 50 percent of the inspectees were voluntary drive-ins.

The inspection consisted of examining over 60 components, including brake/wheel assembly components associated with the removal of the right front and right rear wheels. The inspection list covered the principal items required under the state's once-per-year periodic inspection system, and all items in the federal vehicle-in-use standards. In carrying out the validation inspection, the same test procedures and rejection standards as used by the appointed garages were used by the field test personnel. Therefore, it is possible to make a direct evaluation on a limited sample of cars of the (1) effectiveness of Missouri inspection in detecting defects and requiring their repair/replacement, and (2) sensitivity of the vehicle condition to elapsed time since inspection.

It is not possible to judge the typicality of the sampled population, since no demographic information was collected from the participating motorists. The representativeness of the sampled vehicle population using the quasi-random vehicle selection technique was assessed by comparison with target profile data.

In general, vehicle makes were sampled without bias but the model year distribution was biased towards newer cars. This result is not surprising since the target profile was based on 1975 R. L. Polk vehicle distributional data which always lags current time by

A five-category chi-square test was used to test the match between sample vehicle makes (AMC, Chrysler, Ford, GM, and imports) and the R. L. Polk profile for the State of Missouri. A chi-square statistic of 5.9 is computed, and the associated level of significance for rejecting the (null) hypothesis that the sample of vehicle makes does match that of the underlying population is 32 percent. Clearly, at a 5 percent significance level the hypothesis of a match between sampled and expected vehicle counts cannot be rejected.

The distribution of other vehicle acquisition parameters was also evaluated. AMC and import cars were sampled independent of month since inspection, while the per month distribution of the other classes did exhibit a bias. There was a heavier concentration of vehicles sampled in the first three months than in any other quarter-year period. The by-month selection of cars over all vehicle classes, but with class integrity maintained, is independent of month since inspection at the 10 percent significance level, but not at the 5 percent level.

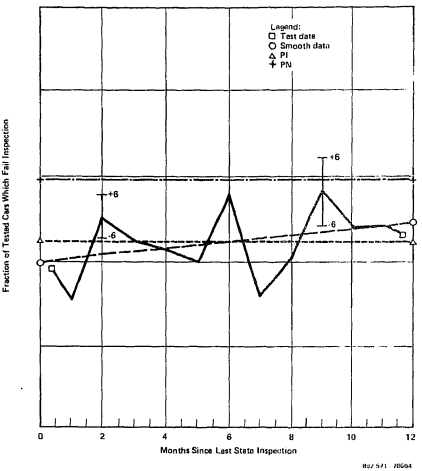
Older vehicles (1967 and older) were selected relatively evenly by month since inspection, while middle-aged and newer cars show a bias towards the first quarter. The by-month selection of cars over all model year groupings, but with age group maintained, is independent of month since inspection at the 10 percent significance level, and sensitive to month at the 5 percent level.

The distribution of sampled cars by mileage category tracks independently of months since inspection, although there are several mileage groupings which were not sampled evenly across the 12 months.

The defect-time since inspection results are marked by considerable data variation. The aggregated set of Missouri inspection items (Figure 3–1) shows a measure of effectiveness of 25.3 percent. This means that the time-averaged failure probability (P_I) of 44.4 percent would reach a value of 59.4 percent if Missouri did not have periodic inspection. The hypothesis that reject rate is independent of time since inspection can be rejected at the 28 percent significance level. The curve fit hypothesis (time since inspection data points match the MOE predictive curve) cannot be rejected at the 20 percent significance level.

The noisy field data are a reflection of two conditions—relatively few samples per month and the possibility of a seasonal effect. The test sample was inspected in September 1976, and months since inspection are measured from this date. The retrospective, 12-month snapshot will reflect definite calendar year effects. For example, the rejection rate for the 7th month since inspection is particularly low and tends to distort the curve. What happened in the February-March time period in St. Louis which would tend to reduce the post-inspection errors for inspections performed at that time? There is no clear answer to this question, but there is a general point to be made. If evaluation data were collected at several times during the year, the "apparent" seasonal effect would be distributed more evenly and the aggregated data would be less noisy.

Figure 3-1
Aggregate Reject for Major Missouri Inspection Items
Missouri field test – September 1976 – per car results MOE – 25.3 percent and PI – 44.4 percent



The validation results suggest that inspection stringency (inspection error at time of inspection) may be of concern. Four cars in 10 fail the Missouri state inspection within one month of receiving a pass sticker from an appointed garage/state inspection station. The need for a better understanding of the inspection stringency situation, and enforcement of the inspection standard at time of inspection, is apparent.

3.2 Inspection Stringency Evaluations

3.2.1 Administrative Procedures

Administrative data were collected from two areas in Missouri in conformance with prescribed procedure.

St. Louis was selected as typical of urban areas and Springfield of suburban areas. The data from 58 inspection station visits were analyzed using compliance rate and correlation testing as the basis of evaluation.

Both St. Louis and Springfield inspection stations s' ·w extremely high conformity to stated rules and regulations. The weighted state figure (without a rural sample) is 87.3 percent compliance. The St. Louis results do show sensitivity to inspection station type (gas station, dealer, general repairs, or chain and specialty). The Springfield results do not track with facility type.

3.2.2 Test Procedure

Test procedure data were collected from the population regions in the Greater St. Louis area of Missouri in conformance with prescribed procedures. These data do not indicate whether inspections were performed correctly—only whether pro-forma test procedures were followed. One hundred and sixty-nine inspection-observations were analyzed using compliance rate and correlation as the basis of evaluation.

The city of St. Louis (urban region) shows an overall compliance rate of 72.0 percent, St. Charles County (suburban region) a rate of 80.3 percent, and Washington County (rural region) a rate of 79.0 percent. The population-weighted figure for the entire state is 77.4 percent. The alignment test has the lowest compliance rate (8.2 percent for St. Louis) while the wheel pull, front lamps, and turn signals show the highest compliance rates (over 90 percent statewide). The results show strong sensitivity to population region.

4.0 PMVI EVALUATION

The objective of this task was to define and design an experiment for conducting a statistically valid test to determine whether PMVI reduces accident rate, injury rate, and fatality rate.

A technically valid experiment *is* defined, thereby fulfilling the primary objective. Furthermore, it is shown that most classic experimental designs, however potent they may potentially be, prove to be inadequate for testing and isolating the PMVI-effect from the many exogenous variables masking it. When applied

The experiment defined is statistically valid if fo lowed as prescribed. It may be considered costly, an legislation will probably be required to mandate pa ticipation by all members of the population selecte The essential ingredient in the experiment lies in th creation of the two groups (PMVI and no-PMVI) t be tested. A single population is chosen, and a ran dom dichotomy is made to define the two test group A prescribed PMVI is provided one group in whic members are randomly assigned inspection date Several experimental designs, such as the Latin squar are applicable here depending upon availability c time and of funds. The experiment may be conducte testing total accident rates or defect-induced accide rates, the latter determined with accident investigatio teams. Relative cost here is a principal determinin factor.

Also of potential interest is the time design, whic tests whether accident rate increases with time sinc last inspection in a PMVI state. The results fro such an experiment are only valid for the PMVI sta in question, and whether inferences can be draw therefrom to the difference in effect of PMVI an no-PMVI for states in general is a question open t subjective interpretation.

Large sample sizes are required to test the effect c interest. Attention is directed to understanding th fundamental limitation posed by the basic model i requiring such large sample sizes. It is shown tha it is the proportion statistic which sets the demand fo large sample sizes: where other underlying probabilit distributions are applicable to the model, fewer sample are needed. For example, instead of measuring simpl injury rate (involving proportion statistics), a mo effective test, requiring smaller sample size, is a plicable to testing cost of injury (involving continuo distributions).

Sample-size requirements for testing at the 0.02 significance level the accident rate differences betwe PMVI and no-PMVI groups are shown in Table 4– Vehicle populations are presented for several assum tions on the effectiveness of inspection and percenta of accidents caused by defective vehicles. For th recommended experiment, these figures should be i creased to account for group attrition. It should b noted, however, that the proposed experiment requir mandated participation and hence the high attritio

Table 4-1

Sample-Size Requirements for 2-Group Accident Rate Comparisons

(0.025 Significance Level)

Conditional Probability of a Defect-Induced Accident	Inspection Effectiveness	Sample Sizes (per group)		
		Model in Which Total Accident Rates Are Compared	Accident Investigation Model	
			Number of Accidents	Number of Vehicles in Population
0.10	0.33	207,000	2,150	17,900
0.12	0.33	140,000	1,760	14,700
0.10	0.50	90,000	845	7,040
0.12	0.50	63,000	691	5,760

In summary, three principal accomplishments of this study are the definition of a new and technically valid experiment, the recognition of the weaknesses in most experimental designs which might have been entertained, and an understanding of the fundamental limitations posed by the proportion model and a means for overcoming them.

ABSTRACT CITATIONS

SAMPLE ENTRIES

FORMAT OF ENTRIES IN HIGHWAY SAFETY LITERATURE

NHTSA accession number ---------- HS-013 124

Title of document ---------- **MAXIMUM BRAKE PEDAL FORCES PRODUCED BY MALE AND FEMALE DRIVERS**

Abstract ----------

The object of this research was to obtain data concerning the maximum amount of brake pedal force that automobile drivers were able to sustain over a period of ten seconds. Subjects were told to apply the brakes in the test car as they would in a panic stop, and to exert as much force as possible on the pedal over the entire ten second test period. A total of 84 subjects were tested, including 42 males and 42 females. The results indicated that there is a wide distribution of values which characterizes the pedal force that the subjects were able to generate. Male subjects produced generally higher forces than did females. Over half the women tested were unable to exert more than 150 lbs. of force with either foot alone, but when both feet were applied to the pedal, force levels rose significantly.

Personal author(s) ---------- by C. R. VonBuseck
Corporate author (or author's affiliation) ---------- General Motors Corp.
Publication date; pagination ---------- 1973? ; 18p
Supplementary note ---------- Excerpts from Maximum Parking Brake Forces Applied by Male and Female Drivers (EM-23) BY R. L. Bierley, 1965, are included.
Availability ---------- Availability: Corporate author

NHTSA accession number ---------- HS-018 924

Title of document ---------- **NATURAL FREQUENCIES OF THE BIAS TIRE**

Abstract ----------

The lowest natural frequencies of a bias tire under inflation pressure are deduced by assuming the bias tire as a composite structure of a bias-laminated, toroidal membrane shell and rigorously taking three displacement components into consideration. The point collocation method is used to solve a derived system of differential equations with variable coefficients. It is found that the lowest natural frequencies calculated for two kinds of bias tire agree well with the corresponding experimental results in a wide range of inflation pressures. Results of the approximate analysis show that the influences of the in-plane inertia forces on natural frequency may be considered small, but the influences of in-plane displacements are large, particularly on the natural frequency of the tire under low inflation pressure.

Personal author(s) ---------- by Masami Hirano; Takashi Akasaka
Journal citation ---------- Publ: Tire Science and Technology v4 n2 p86-114 (May 1976)
Publication date ---------- 1976; 6refs
Availability ---------- Availability: See publication

HS-022 244

EFFECTS OF ENGINE PARAMETERS AND CATALYST COMPOSITION ON VEHICLE SULFATE EMISSIONS

THE EFFECTS OF SPARK TIMING, EXHAUST GAS RECIRCULATION (EGR), OXYGEN CONCENTRATION, AND CATALYST COMPOSITION ON SULFATE EMISSIONS FROM TWO OXIDATION CATALYST EQUIPPED, 400 CUBIC INCH DISPLACEMENT (CID) VEHICLES WERE MEASURED USING A DILUTION TUBE. THE VEHICLES WERE IDENTICAL FORD LTD'S; ONE WAS CALIBRATED FOR 1976 FEDERAL EMISSION STANDARDS, THE OTHER FOR THE STRICTER 1976 CALIFORNIA STANDARDS. AT STEADY-STATE 72 KM/HR (45 MPH), THE CONVERSION OF SO2 (SULFUR DIOXIDE) TO SO3 (SULFUR TRIOXIDE) OVER ENGELHARD IIB CATALYSTS AS A FUNCTION OF OXYGEN CONCENTRATION WAS FOUND TO BE SIMILAR TO THAT OBSERVED IN LABORATORY STUDIES; A DRAMATIC REDUCTION IN SULFATE EMISSIONS OCCURS AT 1% 02 (OXYGEN). ON THE ENVIRONMENTAL PROTECTION AGENCY (EPA) CONGESTED FREEWAY DRIVING SCHEDULE (CFDS), THE SULFATE EMISSION LEVEL WAS CONSIDERABLY LOWER THAN ON THE 72 KPH CRUISE, AND NO SHARP REDUCTION AT LOW AVERAGE OXYGEN CONCENTRATIONS WAS SEEN. SULFATE STORAGE IN THE CATALYST WASHCOAT, AND SUBSEQUENT RELEASE, COULD EXPLAIN THESE OBSERVATIONS. CHANGING THE SPARK TIMING FROM 6 DEGREES TO 16 DEGREES BEFORE TOP DEAD CENTER (BTDC) AND DISABLING THE EGR HAD NO EFFECT ON SULFATE EMISSIONS OVER THE CFDS. UNDER STEADY-SPEED OPERATION OF THE FEDERAL VEHICLE AT 72 KPH, THE EMISSION RATES FROM NOBLE-METAL CATALYST FORMULATIONS OF PLATINUM/PALLADIUM, PLATINUM/RHODIUM, AND PURE PALLADIUM WERE 47, 17, AND 6 MG/KM, RESPECTIVELY. THE CORRESPONDING SO2 TO SO3 CONVERSIONS COMPARED WELL WITH LABORATORY EXPERIMENTS. HOWEVER, QUITE DIFFERENT RESULTS WERE OBTAINED FROM THE CFDS; FOR ALL THE CATALYSTS, THE EMISSION RATES WERE 4-7 MG/KM ON THE FEDERAL VEHICLE AND 16-28 MG/KM ON THE CALIFORNIA VEHICLE. THE MITIGATION OF THE DIFFERENCES BETWEEN CATALYSTS INDICATES THAT UNDER REALISTIC DRIVING CONDITIONS, THE NOBLE-METAL CATALYST COMPOSITION MAY BE UNIMPORTANT IN DETERMINING SULFATE EMISSIONS. MOREOVER, MISLEADING CONCLUSIONS MAY BE DERIVED FROM LABORATORY STUDIES WHICH DO NOT INCORPORATE CYCLIC OPERATION. THE HIGHER EMISSION LEVELS FROM THE CALIFORNIA CAR IMPLY THAT EFFORTS TO MEET STRICTER GASEOUS EMISSION STANDARDS MAY LEAD TO HIGHER SULFATE EMISSIONS.

by D. E. MCKEE
FORD MOTOR CO., RES. STAFF
Rept. No. SAE-770167; 1977; 12P 16REFS
PRESENTED AT INTERNATIONAL AUTOMOTIVE ENGINEERING CONGRESS AND EXPOSITION, DETROIT, 28 FEB-4 MAR 1977.
Availability: SAE

HS-022 355

FIELD EVALUATION OF MILES-PER-GALLON METERS. FINAL REPORT

ONE HUNDRED FORTY FLEET AUTOMOBILES BASED IN LOS ANGELES, CALIF., WERE USED TO DETERMINE THE EFFECTIVENESS OF MILES-PER-GALLON METERS AS DRIVER AIDS IN IMPROVING FUEL ECONOMY. THE INTENT OF THE EXPERIMENT WAS TO DETERMINE IF A DEVICE WHICH PRESENTS THE DRIVER WITH AN INSTANTANEOUS, REAL-TIME INDICATION OF MILES-PER-GALLON ENGINE PERFORMANCE WOULD HELP THE DRIVER ACHIEVE IMPROVED FUEL ECONOMY IN VEHICLE OPERATION. SEVENTY CARS WERE INSTRUMENTED WITH THE METERS, AND 70 WERE USED WITHOUT METERS FOR CONTROL PURPOSES. FUEL USE AND MILEAGE RECORDS WERE COLLECTED OVER A 12-WEEK PERIOD. THE CARS WERE USED PRIMARILY FOR COMMUTING IN A MIXTURE OF HIGHWAY, URBAN, AND SUBURBAN DRIVING. DRIVERS IN BOTH GROUPS WERE PAID EVERY THREE WEEKS FOR THE AMOUNT OF FUEL THEY SAVED AS COMPARED WITH PRE-TEST FUEL-USE RECORDS. ANALYSIS OF VARIANCE OF THE RESULTING MILES-PER-GALLON AVERAGES REVEALED NO SIGNIFICANT DIFFERENCE IN FUEL ECONOMY BETWEEN THE TWO GROUPS: 13.89 MPG FOR THOSE VEHICLES WITH MPG METERS AND 13.51 MPG FOR THOSE WITHOUT. FOR THE GIVEN STUDY CONDITIONS, MPG METERS DID NOT IMPROVE FUEL ECONOMY. INSTALLATION OF MILES-PER-GALLON METERS WOULD REQUIRE EIGHT TO SIXTEEN HOURS FOR INSTALLATION. FIVE APPENDICES INCLUDE DRIVING SKILL TIPS; SUBJECT DATA SUMMARY; FUEL TOTALIZER ACCURACY AND EQUIPMENT FAILURES; TOTALIZER ACCURACY; AND REPORT OF INVENTIONS.

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DOT-TSC-1160
Rept. No. DOT-TSC-OST-77-64; 1977; 37P 2REFS
Availability: NTIS

HS-022 356

DIMENSIONS OF CHILDREN AS RELATED TO THE CONSTRUCTION OF CHILD RESTRAINT SYSTEMS

INFORMATION ABOUT ANTHROPOMETRIC DIMENSIONS OF CHILDREN IS REPORTED IN GRAPHIC FORM FOR USE IN DESIGN OF CHILD RESTRAINT SYSTEMS IN MOTOR VEHICLES. DIAGRAMS OF 21 DIMENSIONS VERSUS MASS ARE DERIVED FROM SEVEN LITERATURE SOURCES AND ESTIMATES, AS AN ACTUAL SURVEY OF CHILD MEASUREMENTS WAS NOT POSSIBLE. EACH OF THE 21 DIMENSIONS IS REPORTED FOR THE FIFTH, FIFTIETH, AND NINETY-FIFTH PERCENTILE, WITH ALL DIAGRAMS REFERRING TO THE MEAN OF BOYS AND GIRLS WITHOUT CLOTHING. SURVEY RESULTS ON CHILDREN IN THE U.S. ARE SIMILAR TO SWEDISH AND DUTCH CHIL-

DREN, WITH MASS VERSUS AGE DIFFERING LESS THAN 2 KG AND FOR STATURE LESS THAN 4 CM.

by H. S. T. BROCKHOFF; C. OUDESLUYS; J. C. BASTIAANSE
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Rept. No. TNO-713003-B; 1976; 65P 10REFS
Availability: INSTITUUT VOOR WEGTRANSPORTMIDDELEN, TNO-COMPLEX ZUIDPOLDER, POSTBUS 237, DELFT, NETHERLANDS

HS-022 357

STANDARDS FOR CHILD RESTRAINT DEVICES IN CARS

TABULATED INFORMATION ON EXISTING AND PROPOSED LAWS, REGULATIONS, AND STANDARDS FOR CHILD RESTRAINT DEVICES SUCH AS CHILD SEATS AND HARNESSES IS PRESENTED FROM THE FOLLOWING NATIONS: AUSTRALIA, CANADA, FRANCE, GERMANY, JAPAN, THE NETHERLANDS, NEW ZEALAND, SWEDEN, SWITZERLAND, UNITED KINGDOM, AND THE U.S. ONLY THOSE PARTS OF THE STANDARDS ARE DEALT WITH WHICH RELATE TO CHILDREN HEAVIER THAN ABOUT 9 KG WHO CAN SIT UPRIGHT WITHOUT SUPPORT. GENERALLY THESE ARE RESTRAINT DEVICES WITH A CHILD'S SEAT, OR HARNESSES WITHOUT A CHILD'S SEAT. WIDE VARIATIONS EXIST IN LAWS CONCERNING CHILD RESTRAINTS FOR ELEVEN COUNTRIES DISCUSSED. INTERNATIONALLY THERE IS NO AGREEMENT ABOUT THE AGE AT WHICH CHILDREN CAN SAFELY MAKE USE OF ADULT SEAT BELTS. DIFFERENCES IN GENERAL SPECIFICATIONS INVOLVE COVERED TYPES, ATTACHMENT AND REMOVAL OF THE DEVICE, AND RELEASE OF THE CHILD. FRONTAL, SIDE, AND REAR IMPACT PERFORMANCE ARE EVALUATED BY STATIC AND DYNAMIC TESTING. STANDARDS FOR CHILD RESTRAINTS COVER SUCH ASPECTS AS ROLLOVER PERFORMANCE; WEBBING, STRAPS, AND LOAD-CARRYING COMPONENTS; AND BUCKLES. OTHER RESTRAINT SYSTEMS INCLUDED IN CURRENT REGULATIONS ARE ADJUSTERS; CLIP-ON DEVICES AND OTHER HARDWARE; CAR SEAT BACK RESTRAINTS; AND CHILD SEAT BACK AND HEAD REST. ALSO DISCUSSED AND COMPARED ARE IMPACT SHIELD AND SIDE WINGS; SHOCK ABSORBING MATERIALS; AND PROTRUDING PARTS AND SHARP EDGES. A LARGE NUMBER OF EXISTING AND PROPOSED STANDARDS ARE FOUND TO BE FOCUSED ON CONVENIENCE ASPECTS, WHICH HAVE SAFETY VALUE BECAUSE THEY ENCOURAGE USAGE.

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Rept. No. TNO-713003-E; 1977; 75P 22REFS
Availability: INSTITUUT VOOR WEGTRANSPORTMIDDELEN, TNO-COMPLEX ZUIDPOLDER, POSTBUS 237, DELFT, NETHERLANDS

HS-022 358

DESCRIPTION OF CHILD RESTRAINT DEVICES

INFORMATION GIVEN FOR 43 CHILD RESTRAIN SYSTEMS ON THE U.S., CANADIAN, AND EUROPEA MARKETS INCLUDES THE FOLLOWING: PHOTO GRAPH(S); MANUFACTURER; STANDARD WIT WHICH IT COMPLIES; MASS AND AGE RANGES DESCRIPTIONS OF SHELL, ANCHORAGES, HARNESS BUCKLE, AND PADDING; DESCRIPTION OF HARNES AND SEAT-ATTACHMENT ADJUSTMENTS; AN EVALUATION. THE BASIC TYPES OF RESTRAIN DEVICES MOST COMMONLY USED ARE THE FO WARD/REARWARD FACING SEAT WITH HARNES HARNESS WITHOUT SEAT, IMPACT SHIELD WITH O WITHOUT SEAT, AND CARRY-COT RESTRAINT. TH TEN CHILD RESTRAINT DEVICES OF PARTICULAR I TEREST ARE THE FOLLOWING: BABY RELA BECAUSE OF ITS SHAPE AND SHELL MATERIA BRITAX SR50, BECAUSE OF ITS TWO-WAY BUCKL BUNNY BEAR, BECAUSE OF ITS LATERAL INFAN MODE; HEDSTROM, BECAUSE OF ITS SHELL DESIG AND PADDING; KANTWET, BECAUSE OF ITS SHEL DESIGN; KLIPPAN SEAT, BECAUSE OF ITS PADDIN AND SHOCK ABSORBER; PETERSON 74/75, BECAUS OF ITS THREE MODES; STORCHENMUHLE JET 6086/ BECAUSE OF ITS INERTIA REEL BELT; STROLEE WE CARE, BECAUSE OF ITS AWKWARD BUCKLE; AN SWINGOMATIC, BECAUSE OF THE IMPACT PART O ITS HARNESS.

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Rept. No. TNO-713003-C; 1976; 95P
Availability: INSTITUUT VOOR WEGTRANSPORTMIDDELEN, TNO-COMPLEX ZUIDPOLDER, POSTBUS 237, DELFT, NETHERLANDS

HS-022 359

SOME SAFETY HINTS YOU CAN GRAB (ON TO) [TRUCK CABS]

CAREFUL SELECTION OF TRUCK CAB COMPONENT CAN GREATLY INCREASE PERSONAL SAFETY O THE RIG'S DRIVER. CONVEX MIRRORS ATTACHED T STANDARD 6 BY 16 INCH WEST COAST MIRRORS C BOTH SIDES OF THE VEHICLE ELIMINATE BLIN SPOTS. LARGER SEVEN OR EIGHT INCH HANG-O CONVEX MIRRORS MINIMIZE DISTORTION CO PARED WITH SMALLER SIZES. HEATED MIRRO ELIMINATE FOGGING AND ICING IN COLDER CL MATES. REMOTE CONTROLLED MIRRORS PROVI ADDED EASE IN MIRROR ADJUSTMENT, PARTIC LARLY IN MOBILE HOME MOVING AND BACKING O CONVENTIONAL TRUCK-TRAILER RIGS. HOWEVE REMOTE CONTROL MIRRORS CAN JAM AND LOCK A MISALIGNED POSITION, AND ALSO REQUIRE TH OPERATOR TO TAKE HIS EYES FROM THE ROA DURING THE ADJUSTMENT. AIR-POWERED WINDOV ON THE VEHICLES RIGHT SIDE REDUCE ACCIDEN RISK BECAUSE THE DRIVER DOES NOT HAVE T LEAN OVER TO ADJUST THE WINDOW. POSITIONIN OF CAB ENTRY ITEMS SUCH AS STEPS AND GRA

RAILS IS CONSIDERED THE MOST IMPORTANT SAFETY FEATURE. A STAIRCASE DESIGN PROVIDES THE EASIEST ENTRY WHEN NONSLIP MATERIAL SUCH AS SCOTCH TRED IS USED ON THE STEP SURFACE. SERRATED STEPS ALSO HELP TO PREVENT SLIPPING. GRAB HANDLES PROVIDE THE MOST SAFETY WHEN THEY SURROUND THE CAB DOOR AND ARE POSITIONED JUST INSIDE THE DOOR. RUBBER COATINGS OR OTHER NONSLIP SURFACES SHOULD BE USED ON HANDLES. ON LONG TRAILERS, A TURN SIGNAL MOUNTED ABOUT ONE THIRD OF THE LENGTH FROM THE CAB IS OF BENEFIT IN CITY TRAFFIC. REFLECTIVE DECALS, LOGOS, OR PAINTS INCREASE SAFETY IN NIGHTTIME DRIVING.

by LINDA PELLEGRINI
Publ: OWNER OPERATOR V8 N1 P55-7 (JAN-FEB 1978) 1978
BASED ON PANEL MEETING, NATIONAL SAFETY CONGRESS, CHICAGO.
Availability: SEE PUBLICATION

HS-022 360

DISC BRAKES FOR BIG TRUCKS

CONTROVERSY SURROUNDS THE DEVELOPMENT OF DISC BRAKES FOR HEAVY-DUTY TRUCKS AS SOME MANUFACTURERS SEE NO DEFINITE ADVANTAGES AND OTHERS FORESEE DRAMATIC IMPROVEMENTS IN BRAKE PERFORMANCE. DISC BRAKE DESIGN HAS BEEN INTEGRATED TO DATE WITH HYDRAULIC BRAKE SYSTEMS BECAUSE THE 1800 PSI FLUID PRESSURE REQUIRED TO OPERATE A DISC BRAKE IS DIRECTLY OBTAINABLE WITH HYDRAULIC ACTIVATION. STRAIGHT-AIR BRAKING USED IN MOST HEAVY-DUTY TRUCKS REQUIRES REVISIONS IN DISC BRAKE DESIGN. SEVERAL MECHANICAL FORCE-MULTIPLYING DEVICES ARE CURRENTLY BEING USED: THE WEDGE, POWER SCREW, AND CAM. MOST HEAVY TRUCK MANUFACTURERS ARE IN THE PROCESS OF DESIGNING DISC BRAKE SYSTEMS NOW THAT PRESENT BRAKE SYSTEMS MANDATED BY FEDERAL MOTOR VEHICLE SAFETY STANDARD (FMVSS) 121 HAVE BEEN OPERATIONALIZED. FADE RESISTANCE IS CONSIDERED TO BE A MAJOR ADVANTAGE OF DISC BRAKES COMPARED WITH DRUM BRAKES FOR ANY TYPE OF VEHICLE. DIRECTIONAL STABILITY, SUPERIOR WATER RECOVERY, AND MAINTENANCE AND OPERATIONAL ECONOMIES ALSO CHARACTERIZE DISC BRAKE USAGE. PROBLEMS ARE ANTICIPATED AS DISC BRAKES ARE INTRODUCED IN THAT DISC-BRAKED TRACTORS COUPLED WITH TRAILERS USING OTHER BRAKING SYSTEMS WILL CAUSE PREMATURE WEAR AND ADJUSTMENT DIFFICULTIES. POOR LINING LIFE WITH DISC BRAKES IS PREDICTED BY SEVERAL MANUFACTURERS. DISC BRAKES CAN REACH THE POINT OF FIRE AND SELF-DESTRUCTION DURING TESTING, WHEREAS FADE RESISTANCE IN DRUM BRAKES WARNS THE DRIVER THAT TOO MUCH BRAKING PRESSURE IS BEING APPLIED. TWO BRAKE MANUFACTURERS ARE PLANNING TO INTRODUCE AIR-ACTIVATED DISC BRAKES INTO THE HEAVY-DUTY TRUCK MARKET IN 1978.

by DAVE RITCHIE
Publ: OWNER OPERATOR V8 N1 P15-22 (JAN-FEB 1978) 1978
Availability: SEE PUBLICATION

HS-022 361

ALTERNATIVES FOR IMPROVING URBAN TRANSPORTATION. A MANAGEMENT OVERVIEW

AN OVERVIEW OF URBAN TRANSPORTATION ALTERNATIVES WAS PREPARED AS A COURSE FOR MANAGEMENT, SUPERVISORY, AND TECHNICAL PERSONNEL IN VARIOUS FEDERAL, STATE, AND LOCAL HIGHWAY AGENCIES. URBAN TRANSPORTATION CAN BE IMPROVED USING EXISTING SYSTEMS AND RESOURCES VIA SUCH ALTERNATIVES AS IMPROVING TRAFFIC OPERATIONS, IMPROVING URBAN GOODS MOVEMENT, RIDE SHARING PROGRAMS, DEMAND MANAGEMENT, TRANSPORTATION PRICING, AND IMPROVED PUBLIC TRANSIT. THE COURSE IS DIVIDED INTO 14 SECTIONS, BEGINNING WITH A HISTORICAL OVERVIEW; CLASSIFICATION OF PROBLEMS AND SOLUTIONS; AND REVIEWS OF DEMAND-ORIENTED AND CAPACITY-ORIENTED ALTERNATIVES. FACTORS INFLUENCING URBAN TRANSPORTATION NEEDS INCLUDE URBAN TRAVEL AND DEVELOPMENT PATTERNS, TRANSPORTATION CONSTRAINTS ON CITY SIZE; AND INFLUENCE ON FUTURE DEVELOPMENT. TRANSPORTATION PRICING IS VIEWED IN TERMS OF CONSUMER DEMAND, TRANSIT FARE AND SERVICE CHARGES, AND PRICING AUTO USE. PEAK PERIOD DEMAND MANAGEMENT CAN BE EFFECTIVELY HANDLED BY ACCOUNTING FOR VARIABLE WORK HOURS AND A SHORTER WORK WEEK. RIDE SHARING PROGRAMS INCLUDE CARPOOLS, VANPOOLS, SHARED TAXIS, JITNEYS, AND SUBSCRIPTION BUS SERVICE. PUBLIC TRANSPORTATION CAN BE IMPROVED WITH BETTER BUS TRANSIT, PREFERENTIAL TREATMENT, AND RAPID RAIL TRANSIT IMPROVEMENTS. BICYCLING AS AN URBAN TRANSPORTATION MODE REQUIRES PLANNING, FACILITY DESIGN AND FUNDING, AND OPERATION AND CONTROL. PEDESTRIAN FACILITIES, TRAFFIC, AND FREEWAY OPERATIONS ALSO REQUIRE SPECIFIC TYPES OF PLANNING AND MANAGEMENT TO IMPROVE URBAN TRANSPORTATION SYSTEMS.

by NEILON J. ROWAN; DONALD L. WOODS; VERGIL G. STOVER
TEXAS A AND M UNIV., TEXAS TRANSPORTATION INST., COLLEGE STATION, TEX.
DOT-FH-11-8510
Rept. No. TECHNOLOGY-SHARING-REPORT-77-215; 1977; 109P 111REFS
Availability: FEDERAL HWY. ADMINISTRATION (HDV-21), WASHINGTON, D.C. 20590

HS-022 362

AN ANALYSIS OF ENERGY USE BY PASSENGER TRANSPORT IN THE U.K. [UNITED KINGDOM]

ENERGY USE IN PASSENGER TRANSPORT IS ANALYZED IN TERMS OF THE RELATIVE IMPORTANCE OF PASSENGER TRANSPORT AS AN END USE OF ENERGY; NATURE OF CURRENT ENERGY USE BY PASSENGER TRANSPORT; AND IMPLICATIONS FROM THE VIEWPOINT OF ENERGY RELATED POLICY IMPOSED BY CENTRAL GOVERNMENT. IN 1973 THE TRANSPORT SECTOR IN THE UNITED KINGDOM ACCOUNTED FOR ABOUT ONE FIFTH OF TOTAL CONSUMPTION OF ENERGY BY FINAL USERS AND WAS ALMOST TOTALLY DEPENDENT ON THE DIRECT USE OF PETROLEUM FOR ITS ENERGY SOURCE. ROAD TRANSPORT ACCOUNTED FOR 77% OF ENERGY CONSUMPTION BY FINAL USERS IN 1973, WITH PRIVATE ROAD TRANSPORT, MOSTLY CARS AND TAXIS, ACCOUNTING FOR 80% OF THE PASSENGER MARKET. BASED ON DATA FROM THE 1972-1973 NATIONAL TRAVEL SURVEY, PRIVATE VEHICLES ACCOUNT FOR 71% OF ALL PERSON-KILOMETERS OF TRAVEL, THE HIGHEST ENERGY CONSUMPTION OCCURS WITH PRIVATE VEHICLES USED FOR URBAN WORK JOURNEYS; ENERGY CONSUMPTION IS LOWEST FOR BUS SERVICES. INCREASED ENERGY COSTS OVER THE PAST SEVERAL YEARS HAVE BROUGHT ABOUT AN EMPHASIS ON MORE ENERGY-EFFICIENT FORMS OF PRIVATE TRANSPORT, RATHER THAN INCREASED UTILIZATION OF PUBLIC TRANSPORT SYSTEMS. FUTURE INCREASES IN PETROLEUM PRICES ARE EXPECTED TO REDUCE THE AMOUNT OF NONESSENTIAL TRAVEL AND RESULT IN SLOWER ECONOMIC GROWTH. GOVERNMENT INTERVENTION COULD POSSIBLY REDUCE CURRENT PRIVATE TRANSPORT ENERGY USE BY 10%, WITH MEASURES AIMED AT TRANSFERRING 50% OF URBAN WORK TRIPS BY PRIVATE VEHICLE TO BUS TRANSPORT. OTHER PERSONAL AND SOCIAL MOTORING WOULD HAVE TO BE REDUCED BY 36%, AND AVERAGE MILES PER GALLON OF PRIVATE VEHICLES WOULD HAVE TO BE INCREASED BY 15%. SPECIFIC POLICY ACTIONS WOULD INCLUDE TRAFFIC RESTRAINT MEASURES IN URBAN CENTERS, HIGHER FUEL AND VEHICLE TAXATION, AND REGULATORY TAXATION OF VEHICLE ENGINE SIZES AND PERFORMANCE.

by D. MALTBY; I. G. MONTEATH; K. A. LAWLER
Publ: TRAFFIC ENGINEERING AND CONTROL V18 N12 P564-8 (DEC 1977)
1977; 8REFS
SUPPORTED BY SCIENCE RES. COUNCIL.
Availability: SEE PUBLICATION

HS-022 363

SOME OBSERVATIONS OF DRIVER GAP-ACCEPTANCE BEHAVIOUR AT A PRIORITY INTERSECTION

AN INVESTIGATION OF DRIVER GAP-ACCEPTANCE BEHAVIOR INVOLVES OBSERVATIONS OF SITUATIONS IN WHICH DRIVERS ARE WAITING TO MAKE HIGHWAY CROSSINGS AT PRIORITY INTERSECTIONS. FILMINGS OF AN INTERSECTION ON 79 EVENINGS PROVIDED SUFFICIENT DATA FOR ANALYSES ON 46 DRIVERS OF VARYING AGE AND SEX AND DRIVING A WIDE VARIETY OF CARS. ALL DRIVERS WERE MAK ING RIGHT TURNS. EXPERIMENTAL SUBJECTS WERE ALSO USED TO COLLECT DATA ON DRIVER GAP-AC CEPTANCE BEHAVIOR IN THE SAME INTERSECTION GAP SIZES ACCEPTED OR REJECTED BY EACH DRIVER WERE ABSTRACTED FROM TIME-LAPSE FILMS AND THE GAP-ACCEPTANCE PROBABILITY FUNCTION OF EACH DRIVER WAS CONSTRUCTED. FACTORS MOST DIRECTLY INFLUENCING GAP-AC CEPTANCE BEHAVIOR APPEARED TO BE SPEED OF APPROACHING VEHICLE; GAPS AND LAGS; AND WAITING TIME. A LONGER WAITING TIME CONDI TION RESULTS IN GREATER PERCENTAGES OF GAPS BEING ACCEPTED. BOTH STUDIES PRODUCED SIMILAR RESULTS AND ALL DRIVERS EXHIBITED CONSIDERABLE VARIABILITY. FOR EXPERIMENTAL SUBJECTS, APPROACHING VEHICLES TRAVELING MORE QUICKLY WERE ASSOCIATED WITH SHORTER ACCEPTED GAPS IN TIME BUT LONGER ACCEPTED GAPS IN DISTANCE, WHEREAS THIS WAS NOT DEMONSTRATED FOR THE OBSERVED DRIVERS. THE ASSUMPTION THAT ALL DRIVERS BEHAVE IN ACCORDANCE WITH THE SAME GAP-ACCEPTANCE PROBABILITY FUNCTION IS PREFERABLE TO ASSIGNING A FIXED BUT DIFFERENT CRITICAL ACCEPTANCE GAP TO EACH DRIVER, ALTHOUGH NEITHER MODEL DESCRIBES THE TRUE SITUATION.

by R. ASHWORTH; C. G. BOTTOM
Publ: TRAFFIC ENGINEERING AND CONTROL V18 N12 P569-71 (DEC 1977)
1977; 10REFS
Availability: SEE PUBLICATION

HS-022 364

IDENTIFICATION OF HAZARDOUS LOCATIONS [ON HIGHWAYS]. EXECUTIVE SUMMARY

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DOT-FH-11-8279
Rept. No. FHWA-RD-77-81; PTI-7602; 1977; 24P
FOR ABSTRACT SEE HS-022 365; USER'S MANUAL IS HS-022 278.
Availability: NTIS

HS-022 365

IDENTIFICATION OF HAZARDOUS LOCATIONS [ON HIGHWAYS]. FINAL REPORT

PROCEDURES FOR IDENTIFYING HAZARDOUS LOCATIONS ON HIGHWAY FACILITIES HAVE BEEN DEVELOPED AND VERIFIED. A HAZARDOUSNESS RATING FORMULA (HRF) WAS DEVELOPED WHICH INCORPORATES BOTH ACCIDENT AND NONACCIDENT MEASURES, OR PREDICTORS. THE INTENT OF SUCH A FORMULA IS TO SUPPLEMENT, RATHER THAN REPLACE, ACCIDENT RECORD SYSTEMS IN ESTABLISHING THE RELATIVE HAZARDOUSNESS AT SPOT LOCATIONS WITHIN THE HIGHWAY SYSTEM. THE FORMULA PROVIDES A MEANS FOR ESTABLISHING A HAZARDOUSNESS INDEX FOR ANY SUSPECT

SITE. THE HRF INCORPORATES DATA INPUTS REGARDING THE NUMBER OF ACCIDENTS PER YEAR, ACCIDENT RATE (ACCIDENTS PER MILLION ENTERING VEHICLES), ACCIDENT SEVERITY, SIGHT DISTANCE, VOLUME/CAPACITY RATIO, TRAFFIC CONFLICTS, ERRATIC MANEUVER COUNTS, AND TWO SUBJECTIVE INDICATORS -- DRIVER EXPECTANCY AND INFORMATION SYSTEM DEFICIENCIES. THE FORM, CONTROL VALUES FOR ESTABLISHING THREE LEVELS OF HAZARDOUSNESS (NORMAL, HAZARDOUS, AND VERY HAZARDOUS), AND SCALING CHARTS NECESSARY TO CONVERT RAW DATA VALUES INTO A HAZARDOUSNESS INDICATOR VALUE ARE PRESENTED FOR EACH INDICATOR. THE CONCEPT OF THE HRF TO ASSESS RELATIVE HAZARDOUSNESS AT SPOT LOCATIONS APPEARS TO BE VALID, BASED ON RESULTS OF WORKSHOPS CONDUCTED AS PART OF THE RESEARCH PROJECT, AND LIMITED STATISTICAL ANALYSIS OF DATA FROM 12 STUDY SITES. APPENDICES INCLUDE A LIST OF WORKSHOP PARTICIPANTS AND SITE DATA.

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SUMMARY REPT. IS HS-022 364; USER'S MANUAL IS HS-022 278.
Availability: NTIS

HS-022 366

DRINKING PATTERNS AND DRINKING PROBLEMS OF COLLEGE STUDENTS

A RECENT SURVEY OF 1128 STUDENTS AT 13 U.S. COLLEGES, COMPARED WITH FINDINGS OF PREVIOUS STUDIES, FOUND THAT MORE BLACK AND WHITE WOMEN ARE DRINKING, FEWER BLACK MEN ARE HEAVY DRINKERS, THERE ARE FEWER DIFFERENCES IN THE DRINKING PATTERNS OF FRESHMEN AND SENIORS, AND THERE HAS BEEN NO INCREASE IN THE INCIDENCE OF DRINKING-RELATED PROBLEMS. THE STUDY WAS CONDUCTED TO ASSESS THE FREQUENCY AND QUANTITY OF DRINKING, TO DETERMINE THE FREQUENCY OF PROBLEM BEHAVIOR RESULTING FROM DRINKING, TO COMPARE THESE DRINKING PATTERNS WITH PAST TRENDS, AND TO ANALYZE DRINKING BEHAVIOR ACCORDING TO SELECTED DEMOGRAPHIC VARIABLES. A STUDENT ALCOHOL QUESTIONNAIRE WAS USED CONTAINING 70 QUESTIONS ON DRINKING-RELATED BEHAVIOR, KNOWLEDGE OF ALCOHOL AND ITS EFFECTS, AND DEMOGRAPHIC VARIABLES. A QUANTITY-FREQUENCY INDEX WAS USED TO DETERMINE DRINKER CLASSIFICATIONS. MOST STUDENTS (79%) DRANK AT LEAST ONCE A YEAR, AND ABOUT HALF (57%) DRANK AT LEAST ONCE A MONTH OR MORE. OF THESE STUDENTS, 70% DRANK BEER, 65% DRANK WINE, AND 75% DRANK SPIRITS AT LEAST ONCE A YEAR, AND 57% DRANK BEER, 41% DRANK WINE, AND 45% DRANK SPIRITS ONCE A MONTH OR MORE. ABOUT ONE HALF OF ALL STUDENTS REPORTED HAVING HAD UP TO FOUR PROBLEMS OCCUR AS A RESULT OF DRINKING. ALTHOUGH EDUCATORS, ADMINISTRATORS, AND STUDENTS APPEAR TO FEEL THAT THERE HAS BEEN A DRAMATIC INCREASE IN DRINKING AND DRINKING-RELATED PROBLEMS ON COLLEGE CAMPUSES, THE PERCENTAGE OF STUDENTS WHO ARE DRINKING NOW IS SIMILAR TO THE PERCENTAGE DRINKING FIVE AND TWENTY-FIVE YEARS AGO, WITH PROPORTIONS OF HEAVY DRINKERS OR ABSTAINERS ABOUT THE SAME AS SAMPLES STUDIED IN THE PAST. PUBLIC OPINION REGARDING INCREASED DRINKING IN COLLEGES COULD BE ATTRIBUTED TO MORE OPEN DRINKING, LESS HESITANCY TO DISCUSS IT, AND INCREASED AWARENESS OF PROBLEMS ON THE PART OF UNIVERSITY PERSONNEL.

by RUTH C. ENGS
Publ: JOURNAL OF STUDIES ON ALCOHOL V38 N11 P2144-56 (1977)
1977; 37REFS
Availability: SEE PUBLICATION

HS-022 368

MOTOR GASOLINES, WINTER 1976-77

ANALYTICAL DATA FOR 2589 SAMPLES OF MOTOR GASOLINE, FROM SERVICE STATIONS THROUGHOUT THE COUNTRY, WERE COLLECTED AND ANALYZED. SAMPLES REPRESENT THE PRODUCTS OF 50 COMPANIES, LARGE AND SMALL, WHICH MANUFACTURE AND SUPPLY GASOLINE. DATA ARE TABULATED BY GROUPS ACCORDING TO BRANDS (UNLABELED) AND GRADES FOR 17 MARKETING AREAS AND DISTRICTS INTO WHICH THE COUNTRY IS DIVIDED. A MAP SHOWS MARKETING AREAS, DISTRICTS, AND SAMPLING LOCATIONS. ALSO INCLUDED ARE CHARTS INDICATING TRENDS OF SELECTED PROPERTIES OF MOTOR FUELS SINCE 1946. TWELVE OCTANE DISTRIBUTION PERCENT CHARTS FOR AREAS 1, 2, 3, AND 4 FOR UNLEADED, REGULAR, AND PREMIUM GRADES OF GASOLINE ARE PRESENTED. THE ANTIKNOCK (OCTANE) INDEX AVERAGES OF GASOLINES SOLD IN THIS COUNTRY WERE 88.4, 89.7, AND 95.1 FOR UNLEADED, REGULAR, AND PREMIUM GRADES OF GASOLINES RESPECTIVELY.

by ELLA MAE SHELTON
ENERGY RES. AND DEVEL. ADMINISTRATION, BARTLESVILLE ENERGY RES. CENTER, BARTLESVILLE, OKLA.
Rept. No. BERC/PPS-77/3; 1977; 93P 5REFS
Availability: NTIS

HS-022 369

WET BLANKETS [FIRE EXTINGUISHERS FOR AUTOMOBILES]

FIRE EXTINGUISHERS, WHICH CAN BE PURCHASED FOR UNDER $20, ARE IMPORTANT SAFETY EQUIPMENT TO BE CARRIED IN EVERY CAR, AS VEHICLE FIRES OCCUR IN APPROXIMATELY THREE IN EVERY THOUSAND VEHICLES. FIRE RISK IS INCREASED FOR VEHICLES THAT ARE JACKED UP IN THE REAR. THREE BASIC TYPES OF FIRE EXTINGUISHERS CORRESPOND TO THREE KINDS OF POSSIBLE FIRES. CLASS A EXTINGUISHERS CONTAIN WATER OR

LOADED STREAM (POTASSIUM ACETATE IN A NON-FREEZING WATER SOLUTION) AND ARE USED FOR ORDINARY COMBUSTIBLES SUCH AS PAPER OR WOOD. CLASS B EXTINGUISHERS CONTAIN A DRY CHEMICAL AGENT, CARBON DIOXIDE, OR LOADED STREAM AND ARE INTENDED FOR FLAMMABLE LIQUIDS LIKE GASOLINE. CLASS C EXTINGUISHERS CONTAIN A DRY CHEMICAL OR CARBON DIOXIDE AND ARE USED FOR ELECTRICAL EQUIPMENT FIRES. CLASS D EXTINGUISHERS, CONTAINING A DRY POWDER, ARE INTENDED FOR COMBUSTIBLE METALS USED IN MAG WHEELS. MOST COMMON TYPES OF EXTINGUISHERS ARE USABLE ON MORE THAN ONE CLASS OF FIRE. THE HALON 1211 EXTINGUISHER IS MORE EXPENSIVE BUT LEAVES NO RESIDUE AFTER USE, AS OTHER TYPES DO. EXTINGUISHERS FOR USE IN PASSENGER VEHICLES SHOULD HAVE AT LEAST A 2.75 LB-5.00 LB CAPACITY, AND SHOULD BE KEPT IN THE PASSENGER COMPARTMENT. MOST EXTINGUISHERS HAVE A PRESSURE GAUGE TO ENSURE EFFECTIVENESS CHECKING, AND REQUIRE PERIODIC SERVICING. RECHARGEABLE TYPES CAN BE REUSED, AND SHOULD BE RECHARGED EVERY SIX YEARS IF NOT USED.

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1978
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HS-022 370

AFTER DARK [DRIVING AT NIGHT]

NIGHTTIME DRIVING INVOLVES ADDED RISKS AND STRESS FOR THE DRIVER AS COMPARED WITH DRIVING IN DAYLIGHT, AND REQUIRES SPECIAL ATTENTION TO PERIPHERAL VISION, DARK ADAPTATION, GLARE RESISTANCE, AND DRIVING TECHNIQUES. LARGE VARIANCES EXIST IN INDIVIDUAL DRIVERS' ABILITIES TO SEE AND JUDGE DISTANCE IN DARKNESS. PERIPHERAL VISION IS IMPORTANT IN NIGHTTIME DRIVING TO PICK UP SIGNALS, LIGHTS, OR MOVEMENT. IF PERIPHERAL VISION IS NOT GOOD, IT CAN BE COMPENSATED FOR BY A CONSTANT SWEEPING MOVEMENT OF THE EYES. OBJECTS CAN BE BETTER MADE OUT BY FOCUSING A LITTLE TO ONE SIDE, AS CENTRAL VISION IS NOT AS SENSITIVE TO DIMLY LIT SHAPES AS IS PERIPHERAL VISION. WEARING SUNGLASSES IN BRIGHT LIGHT AIDS DARK ADAPTATION BY PRESERVING A RETINAL CHEMICAL USED FOR ADAPTING THE EYES TO DARKNESS. SUNGLASSES CAN BE WORN AT NIGHT WHEN DRIVING INTO A BRIGHT SERVICE AREA, BUT SHOULD NOT BE WORN ON THE ROAD AT NIGHT. GLARE RESISTANCE VARIES AMONG PEOPLE AND CAN OFTEN CAUSE TEMPORARY BLINDNESS AFTER EXPOSURE TO ONCOMING GLARE. GLARE CAN BE MINIMIZED BY CLEANLINESS OF THE INSIDE WINDSHIELD, HEADLIGHTS, EYEGLASSES, AND CONTACT LENSES. THE EYES SHOULD NOT FOCUS ON THE SOURCE OF GLARE, BUT RATHER ON THE SIDE OF THE ROAD OR THE PAINTED LINES. THE MOST IMPORTANT DRIVING TECHNIQUES INVOLVE SPEED SHOULD BE LIMITED BY HEADLIGHT RANGE. PRECAUTIONS ARE PARTICULARLY IMPORTANT DURING TWILIGHT HOURS AND BAD WEATHER.

Publ: DRIVER V11 N8 P22-7 (JAN 1978)
1978
Availability: SEE PUBLICATION

HS-022 371

THE SLOW EVOLUTION OF A NEW AUTOMOBILE COVERAGE

UNINSURED MOTORIST COVERAGE, FIRST INTRODUCED IN THE MID-1950'S, PROVIDES A SOURCE OF INDEMNIFICATION FOR INSUREDS WHO SUSTAIN PERSONAL INJURIES IN AUTOMOBILE ACCIDENTS CAUSED BY NEGLIGENT UNINSURED DRIVERS AND BY UNKNOWN HIT-AND-RUN DRIVERS. ALL STATES HAVE NOW ENACTED SOME TYPE OF LEGISLATIVE MANDATE REQUIRING INSURERS TO INCLUDE UNINSURED MOTORIST COVERAGE WITH ALMOST ALL AUTOMOBILE LIABILITY INSURANCE POLICIES. UNTIL RECENTLY UNINSURED MOTORIST COVERAGE WAS OFTEN WRITTEN WITH LIMITS SUBSTANTIALLY LESS THAN THE LIABILITY COVERAGE ACQUIRED BY SOME PURCHASERS. A FAIRLY SIGNIFICANT BODY OF APPELLATE CASE LAW HAS NOW DEVELOPED IN CONNECTION WITH THE UNINSURED MOTORIST COVERAGE WHERE CLAIMANTS HAVE ESSENTIALLY ARGUED THAT BECAUSE THE TORT-FEASOR WAS UNDERINSURED, THE CLAIMANT SHOULD BE ALLOWED TO SEEK INDEMNIFICATION FROM THE INSURANCE COMPANY THAT ISSUED AN UNINSURED MOTORIST COVERAGE THAT WOULD HAVE BEEN AVAILABLE TO THE CLAIMANT HAD THE TORT-FEASOR BEEN AN UNINSURED MOTORIST. CASES FALL INTO SEVERAL DISTINCT GROUPS. FIRST, THE INSURED TORT-FEASOR WITH COVERAGE THAT SATISFIED LOWER MINIMUM FINANCIAL RESPONSIBILITY REQUIREMENTS OF ANOTHER STATE. A SECOND CATEGORY INVOLVES THE INSURED TORT-FEASOR AND UNINSURED MOTORIST COVERAGE CLAIMS WHERE THE CLAIMANT HAS NOT BEEN FULLY INDEMNIFIED BY LIABILITY COVERAGE. THE UNINSURED TORT-FEASOR AND SINGLE-LIMIT UNINSURED MOTORIST COVERAGE HAS BEEN USED BY MANY INSURANCE COMPANIES AS A STANDARD PROVISION AND CONSTITUTES UNDERINSURANCE. AN AMBIGUITY IS CREATED BY AN INSURANCE COMPANY THAT ISSUES AN ENDORSEMENT WITH SINGLE-LIMIT COVERAGE IN EXCESS OF THE FINANCIAL RESPONSIBILITY REQUIREMENTS THAT USES TERMS DESIGNED FOR A SPLIT LIMIT UNINSURED MOTORIST COVERAGE. SOME STATES HAVE ENACTED LEGISLATION REQUIRING SALES OF COVERAGE WITH HIGHER LIMITS THAN MINIMUM AMOUNTS SPECIFIED IN FINANCIAL RESPONSIBILITY LAWS. HIGHER LIMIT UNINSURED MOTORIST COVERAGE SHOULD BE EXPECTED TO PROVIDE INDEMNIFICATION IN THE EVENT INJURIES ARE CAUSED EITHER BY AN UNINSURED MOTORIST OR

SOMEONE CARRYING LIABILITY INSURANCE WITH LOWER LIMITS.

by ALAN WIDISS
Publ: TRIAL V13 N9 P45-50 (SEP 1977)
1977; 37REFS
REFS. AVAILABLE SEPARATELY FROM PUBLICATION.
Availability: SEE PUBLICATION

HS-022 372

GM 980-X - POTENTIAL APPLICATIONS AND REVIEW [STEEL ALLOY]

GM 980X IS A HIGH-STRENGTH, LOW-ALLOY (HSLA) STEEL WHOSE STRENGTH IS DERIVED FROM A VERY FINE GRAIN SIZE, SUBSTITUTIONAL STRENGTHENING, AND PRECIPITATIONAL STRENGTHENING DUE TO MICRO-ALLOYING ADDITIONS OF EITHER VANADIUM, NIOBIUM, OR TITANIUM WHICH ARE STRONG CARBIDE AND NITRIDE FORMERS. IT HAS BETTER FORMABILITY THAN SAE 950X STEEL AND THE STRENGTH OF SAE 980X STEEL IN THE FORMED COMPONENT. GM 980X HAS BEEN PRODUCED ON EXISTING STEEL MILL EQUIPMENT IN TONNAGE QUANTITIES AND HAS BEEN USED SUCCESSFULLY IN NUMEROUS AUTOMOTIVE COMPONENT TRIALS. TENSILE STRENGTH OF GM 980X IS EQUAL TO THAT OF SAE 980X STEEL BUT ITS TOTAL ELONGATION IS MUCH LARGER. GM 980X HAS A LOW YIELD STRENGTH (IN THE RANGE 550 MPA TO 650 MPA), A HIGH TENSILE STRENGTH, AND A TENSILE/YIELD STRENGTH RATIO OF ABOUT 2. IT HAS A DUAL PHASE MICROSTRUCTURE. GM 980X'S SUPERIOR FORMABILITY AND LIGHT WEIGHT SUGGEST POTENTIAL APPLICATIONS FOR PARTS WHICH COULD NOT BE MADE WITH EXISTING GRADES OF SAE 980X STEELS. A GM 980X BUMPER REINFORCEMENT, WHICH WAS 30% LIGHTER THAN THE PLAIN CARBON STEEL COMPONENT, PERFORMED AS WELL OR BETTER THAN THE PRODUCTION REINFORCEMENT IN 5 MPH BARRIER AND PENDULUM IMPACT TESTS. WEIGHT REDUCTION POTENTIAL OF HIGH STRENGTH STEELS IN BUMPER FACE BARS IS WELL DOCUMENTED. GM 980X FORMING TRIALS ON WHEEL DISCS HAVE BEEN ENTIRELY SUCCESSFUL. USE OF GM 980X IN PULLEY PRODUCTION DEMONSTRATES ITS SUPERIOR FORMABILITY.

by M. S. RASHID
GENERAL MOTORS RES. LABS., METALLURGY DEPT.
Rept. No. SAE-770211; 1977; 15P 20REFS
PRESENTED AT INTERNATIONAL AUTOMOTIVE ENGINEERING CONGRESS AND EXPOSITION, COBO HALL, DETROIT, 28 FEB-4 MAR 1977.
Availability: SAE

HS-022 373

DRUNK DRIVERS: THE TRUCKERS' GREATEST MENACE

DRUNK DRIVERS CONSTITUTE A MAJOR THREAT TO DRIVERS MOVING FREIGHT ACROSS THE COUNTRY. BECAUSE PROFESSIONAL DRIVERS OFTEN COVER MORE THAN 100,000 MILES A YEAR, EXPOSURE TO THE DRUNK DRIVER IS AT LEAST TEN TIMES GREATER THAN THE AVERAGE MOTORIST. MUCH OF THEIR MILEAGE IS LOGGED AT NIGHT WHEN DRUNK DRIVERS MATERIALIZE AND THE ACCIDENT RISK SOARS. THE CURRENT STUDY QUESTIONED 250 PROSECUTING ATTORNEYS, 150 LOWER COURT JUDGES, 50 FEDERAL/STATE HIGHWAY SAFETY COORDINATORS, 35 FLEET SAFETY SUPERVISORS REPRESENTING GENERAL COMMODITY CARRIERS, AND NUMEROUS POLICEMEN, HIGHWAY PATROLMEN, AND PROFESSIONAL DRIVERS. EVERY FIFTIETH CAR IS DRIVEN BY A DRUNK DRIVER, WITH ONE IN SIX CARS BEING DRIVEN BY SOMEONE WHO HAS BEEN DRINKING. COMMODITY CARRIER ACCIDENTS OFTEN INVOLVE A DRUNK DRIVER. DRINKING PROBLEMS AMONG TRUCK DRIVERS DO EXIST, BUT SAFETY RISKS AND STRICT REGULATIONS ACT TO CONTROL INCIDENCE OF DRINKING AND DRIVING. MOST RESPONDENTS FELT THAT REGULATIONS WERE NOT SUFFICIENTLY STRICT TO KEEP DRUNK MOTORISTS AND TRUCK DRIVERS OFF THE ROAD. MANY LOCALITIES HAVE RESORTED TO FINES BECAUSE PROSECUTION IS SO DIFFICULT, PARTICULARLY WHEN JURY TRIALS OR PLEA BARGAINING ARE ALLOWED. THE TRUCKING INDUSTRY CAN SUPPORT EFFORTS TO CONTROL DRUNK DRIVING BY PUSHING FOR UNIFORM LAWS AND REGULATIONS; UTILIZATION OF CB RADIO NETWORKS FOR SAFETY PURPOSES; REQUIRED BLOOD TESTS FOR ALL DRIVERS INVOLVED IN ACCIDENTS; AND PROGRAMS THAT SEEK TO IDENTIFY PROBLEM DRINKERS. OTHER EFFORTS ON THE PART OF TRUCK DRIVERS SHOULD INVOLVE INTENSIFICATION OF COMPANY SAFETY SUPERVISION ON THE HIGHWAY; MONITORING LOCAL COURT AND POLICE ACTION; AND SUPPORTING PUBLIC INFORMATION AND EDUCATION.

by DICK HARRIS
Publ: COMMERCIAL CAR JOURNAL V133 N6 P88-95 (AUG 1977)
1977
Availability: SEE PUBLICATION

HS-022 374

DRIVER EDUCATION AND FATAL CRASH INVOLVEMENT OF TEENAGED DRIVERS. NARRATIVE SUMMARY

FATAL CRASH INVOLVEMENT OF TEENAGERS PER LICENSED DRIVERS AND PER POPULATION IN 27 STATES ARE RELATED TO THE PROPORTIONS WHO RECEIVED DRIVER EDUCATION. THE STUDY WAS BASED ON 108 YEARS OF EXPERIENCE IN 27 STATES, AND MODELED AFTER A RECENT LARGE-SCALE BRITISH STUDY. AMONG 16-17 YEAR OLDS, DRIVER EDUCATION GREATLY INCREASED THE NUMBER OF LICENSED DRIVERS WITHOUT DECREASING THE FATAL CRASH INVOLVEMENT PER 10,000 LICENSED DRIVERS. ABOUT 80% OF THE 16-17 YEAR OLDS WHO OBTAINED LICENSES WOULD NOT BE LICENSED UNTIL AGE 18 OR THEREAFTER IF THERE WERE NO DRIVER EDUCATION IN HIGH SCHOOLS. THE NET EFFECT IS MUCH HIGHER DEATH INVOLVEMENT RATES PER 10,000 POPULATION, ON AVERAGE, IN STATES WITH GREATER PROPORTIONS OF 16-17 YEAR OLDS RECEIVING DRIVER EDUCATION. AT LEAST 2000 FATAL CRASHES PER YEAR THAT WOULD NOT

OTHERWISE OCCUR ARE ATTRIBUTED TO INCREASED LICENSURE OF 16-17 YEAR OLDS BECAUSE OF DRIVER EDUCATION. THE DATA INDICATE THAT MOST TEENAGERS WOULD OBTAIN LICENSES WHEN THEY ARE 18-19 YEARS OLD, IRRESPECTIVE OF DRIVER EDUCATION, AND THAT DEATH INVOLVEMENT RATE PER 10,000 LICENSED 18-19 YEAR OLD DRIVERS WAS UNAFFECTED BY EITHER DRIVER EDUCATION OR DELAYED LICENSURE.

by LEON ROBERTSON; PAUL ZADOR
INSURANCE INST. FOR HWY. SAFETY, WATERGATE 600, WASHINGTON, D.C. 20037
1977; 27P 18REFS
ANALYSIS OF FULL REPT. IS HS-022 375.
Availability: CORPORATE AUTHOR

HS-022 375

ANALYSIS OF "COMMENTARY ON THE RESEARCH REPORT DRIVER EDUCATION AND FATAL CRASH INVOLVEMENT OF TEENAGED DRIVERS CONDUCTED BY THE INSURANCE INSTITUTE FOR HIGHWAY SAFETY AND RELEASED NOV 15, 1977" BY WILLIAM D. CUSHMAN, EXECUTIVE DIRECTOR, AMERICAN DRIVER AND TRAFFIC SAFETY EDUCATION ASSOCIATION

ANALYSIS IS MADE OF A COMMENTARY ON A PREVIOUSLY RELEASED STUDY REGARDING EFFECTS OF DRIVER EDUCATION ON FATAL CRASH INVOLVEMENT OF TEENAGED DRIVERS. CONTRARY TO STATEMENTS MADE IN THE COMMENTARY, THE INSURANCE INST. FOR HWY. SAFETY (IIHS) DISCLAIMS ANY FOREGONE CONCLUSIONS ABOUT THE BENEFITS OR DETRIMENTAL EFFECTS OF DRIVER EDUCATION. THE FACT THAT MANY INSURANCE COMPANIES OFFER DISCOUNTS FOR THOSE HAVING HAD HIGH SCHOOL DRIVER EDUCATION DOES NOT CONFLICT WITH RESULTS OF THE PREVIOUS STUDY. CONTRARY TO ASSERTIONS MADE IN THE COMMENTARY, THE IIHS STUDY IS THOROUGHLY DOCUMENTED BY THEIR PRESENT AND EARLIER BRITISH RESEARCH. IIHS CONCLUDES THAT RAISING THE MINIMUM AGE FOR LICENSURE WOULD SUBSTANTIALLY REDUCE FATAL ACCIDENT INVOLVEMENT OF TEENAGE DRIVERS; THIS DOES NOT IMPLY A CONDEMNATION OF HIGH SCHOOL DRIVER EDUCATION COURSES. THE STUDY'S STATISTICAL BASE WAS THE NATIONAL SAFETY COUNCIL'S INFORMATION ON PARTICIPATION IN HIGH SCHOOL DRIVER EDUCATION PROGRAMS. EFFECT ON LICENSURE OF STATE REQUIREMENTS FOR DRIVER EDUCATION ARE NIL, WHILE THE EFFECT OF THE PROPORTION ACTUALLY RECEIVING DRIVER EDUCATION ON THE PROPORTION OF TEENAGERS LICENSED IS STATISTICALLY SIGNIFICANT. A DEFINITION OF "ADVANCED DRIVER EDUCATION" REQUESTED IN THE COMMENTARY IS A MULTIPLE-RANGE DRIVING COURSE, IN CONTRAST TO CONVENTIONAL HIGH SCHOOL DRIVER EDUCATION.

HS-022 376

REVIEW OF DIESEL COMBUSTION MODELS FOR NOX AND SMOKE EMISSIONS. FINAL REPORT

A CRITICAL REVIEW IS MADE OF THE CURRENT STATE OF KNOWLEDGE OF NITROGEN OXIDES (NOX) AND SOOT FORMATION AND OF OXIDATION IN DIESEL ENGINE COMBUSTION. A CRITICAL REVIEW IS ALSO PRESENTED OF SIX ATTEMPTS AT DIESEL ENGINE COMBUSTION MODELING, PARTICULARLY THE PREDICTION OF THE EFFECT OF DESIGN AND OPERATING VARIABLES ON EXHAUST SMOKE AND NOX. OTHER ATTEMPTS ARE SUMMARIZED. RESULTS ARE PRESENTED OF SOME MEASUREMENTS OF NITRIC OXIDE (NO) IN DIESEL EXHAUST FROM PRODUCTION ENGINES (AND OTHERS) AT SOUTHAMPTON. EXHAUST NOX MEASUREMENTS WERE CORRELATED AGAINST BRAKE MEAN EFFECTIVE PRESSURE (BMEP), AIR/FUEL RATIO, AND CHAMBER SURFACE-TO-SURFACE RATIO. IT IS POSTULATED THAT THE ZELDOVICH OR EXPANDED ZELDOVICH MECHANISMS WILL NO LONGER REPRESENT THE MAJOR NOX FORMATION PROCESSES IN DIESEL ENGINES WHEN NOX EMISSIONS ARE REDUCED SIGNIFICANTLY BELOW CURRENT LEVELS. THREE BASIC KINETIC ROUTES MUST BE INCORPORATED IN ANY QUANTITATIVE MODEL OF NOX FORMATION, BESIDE THE THERMAL REACTIONS OF OXYGEN AND NITROGEN COVERED BY THE ZELDOVICH MECHANISMS. THESE ARE REACTIONS PRODUCING SPECIES SUCH AS THE OXYGEN ATOM IN EXCESS CONCENTRATIONS WHICH PARTICIPATE IN THE THERMAL NO MECHANISM, REACTIONS OF FUEL AND/OR FUEL DECOMPOSITION OR PARTIAL OXIDATION FRAGMENTS WITH NITROGEN AND REACTIONS OF FUEL-BOUND NITROGEN OR NITROGEN-CONTAINING FUEL ADDITIVES. CURRENT DIESEL COMBUSTION MODELS CONTAIN ONLY THE ZELDOVICH REACTIONS. ANOTHER DIMENSION WHICH MAY BECOME SIGNIFICANT IS THE PROBLEM OF TURBULENCE COMBUSTION INTERACTION. NONE OF THE EXISTING DIESEL ENGINE EMISSION MODELS UNDER REVIEW HAS SHOWN ANY PREDICTIVE CAPABILITY. NOX MODELING HAS BEEN MORE EFFECTIVE THAN THAT OF SOOT. COMBUSTION CHAMBER GEOMETRY EFFECTS HAVE NOT BEEN MODELED TO DATE. DEFICIENCIES EXIST IN SUCH BASIC DATA AS FLOWFIELD AND MIXING PROCESSES, TURBULENCE/REACTION RATE INTERACTION, SOOT FORMATION KINETICS, CHEMICAL IGNITION DELAYS, AND NOX CHEMISTRY INVOLVING HYDROCARBON FRAGMENTS. RECOMMENDED FUTURE RESEARCH INCLUDES DEVELOPMENT OF MULTI-ELEMENT COMBUSTION/MIXING ZONE MODELS AND IN-CYLINDER STUDIES OF ENGINES BY SAMPLING PROBES OR OPTICAL TECHNIQUES.

by DAVID ANDERTON
UNIVERSITY OF SOUTHAMPTON, INST. OF SOUND AND VIBRATION RES., SOUTHAMPTON, ENGLAND
DOT-TSC-1101
Rept. No. DOT-TSC-OST-76-57; 1977; 165P 223REFS
REPT. FOR JUN-NOV 1976.

HS-022 377

VEHICLE HANDLING STUDY: SECOND INTERIM REPORT

THREE HUNDRED EIGHTY-SEVEN RANDOMLY SELECTED ACCIDENTS OCCURRING IN WASHTENAW AND PART OF OAKLAND COUNTIES, MICH., WERE INVESTIGATED. DATA RELEVANT TO DETERMINATION OF THE POTENTIAL ROLE OF VEHICLE HANDLING IN ACCIDENT CAUSATION, PARTICULARLY TIRE DATA, WERE COLLECTED ON 518 VEHICLES IN THESE ACCIDENTS. LIMITED TIRE DATA WERE ALSO OBTAINED DURING RANDOM MICHIGAN STATE POLICE CHECKLANE INSPECTIONS IN THE SUMMER OF 1976. THE CHECKLANE AND ACCIDENT SAMPLES WERE COMPARED ON TIRE PRESSURE, TREAD DEPTH, AND CARCASS CONSTRUCTION. ADDITIONAL COMPARISONS WERE MADE BETWEEN SUBSETS OF THE ACCIDENT SAMPLE. THE DATA REVEAL GENERALLY POOR TIRE MAINTENANCE PRACTICES IN BOTH SAMPLES, BUT THERE IS NO EVIDENCE TO IMPLICATE POORLY MAINTAINED TIRES AS CAUSATIVE FACTORS IN ACCIDENTS EXCEPT ON WET OR SLIPPERY ROADS. THIS CONCLUSION IS TENTATIVE BECAUSE OF THE LIMITED NUMBER OF VEHICLES IN THE ACCIDENT SAMPLE, AND BECAUSE THE CONTROL GROUP MAY NOT ADEQUATELY REPRESENT THE POPULATION WHICH GENERATED THE ACCIDENT SAMPLE. LARGER SAMPLE SIZES, MORE DEFINITIVE CONTROL-GROUP DATA, AND DEVELOPMENT OF A DEFINITION FOR VEHICLE-HANDLING ACCIDENTS ARE RECOMMENDED.

by ROBERT E. SCOTT; CHARLES P. COMPTON; LYLE D. FILKINS
UNIVERSITY OF MICHIGAN, HWY. SAFETY RES. INST., ANN ARBOR, MICH. 48109
MVMA-361122
Rept. No. UM-HSRI-77-44; 1977; 91P
REPT. FOR SEP 1975-AUG 1977.
Availability: MOTOR VEHICLE MANUFACTURERS ASSOC., 320 NEW CENTER BLDG., DETROIT, MICH. 48202

HS-022 378

ANTHROPOMETRY AND BIOMECHANICS OF SELECTED POPULATIONS. FINAL REPORT

A LITERATURE SEARCH WAS CONDUCTED, AIDED BY COMPUTER DATA BASES AND PREVIOUS STUDIES OF ANTHROPOMETRY, STRENGTH, BODY KINEMATICS, BIOMECHANICS, AND RANGE OF MOTION. THE PROCEEDINGS OF VARIOUS SOCIETIES WERE REVIEWED IN THE AREAS OF HUMAN FACTORS AND ERGONOMICS, PHYSICAL ANTHROPOLOGY, PHYSICAL MEDICINE AND REHABILITATION, BIOMECHANICS, BIOMEDICINE, BIOENGINEERING, GERONTOLOGY, PSYCHOLOGY, INDUSTRIAL AND OPERATIONS ENGINEERING, AND PHYSIOLOGY. THE RESULTING BIBLIOGRAPHY IS PRESENTED. IT IS CONCLUDED THAT THERE IS LIMITED BASIC INFORMATION ON THE PHYSICALLY HANDICAPPED (AMPUTEES, PARAPLEGICS, AND THE LEFT-HANDED), WOMEN, PREGNANT WOMEN, THE ELDERLY, AND THE OBESE. ONE AMERICAN IN FOUR IS "HANDICAPPED" (INCLUDING THOSE LEFT-HANDED); WOMEN MAKE UP TWO FIFTHS OF THE ENTIRE LABOR FORCE. FUTURE RESEARCH IS RECOMMENDED IN THE FOLLOWING AREAS: STUDY OF FEMALE HUMAN FACTORS AND BIOMECHANICS REQUIREMENTS FOR VARIOUS OCCUPATIONAL ENVIRONMENTS; A COMPREHENSIVE STUDY OF FEMALE STRENGTH CAPABILITIES; ANTHROPOMETRY STUDIES ON THE ELDERLY, THE PREGNANT FEMALE, THE OBESE, AND THE PHYSICALLY DISABLED; STUDY OF THE REQUIREMENTS OF THE LEFT HANDED; INFORMATION ON WORK ENVIRONMENT REQUIREMENTS OF THE PREGNANT FEMALE; AND STUDIES OF THE DISABLED, PARTICULARLY PARAPLEGICS AND AMPUTEES. FACETS OF THE RECOMMENDED RESEARCH SHOULD INCLUDE STRENGTH, HUMAN FACTORS WORKSPACE DESIGN REQUIREMENTS, RANGE OF MOTION, AND BIOMECHANICS CAPABILITIES. PRIORITY SHOULD BE GIVEN TO FEMALE STUDIES, SINCE WOMEN REPRESENT 52% OF THE POPULATION.

by RICHARD G. SNYDER
UNIVERSITY OF MICHIGAN, HWY. SAFETY RES. INST., ANN ARBOR, MICH. 48109
NIOSH-77-12126
Rept. No. UM-HSRI-77-52; 1977; 66P REFS
REPT. FOR 23 JUN 1977-31 OCT 1977.
Availability: CORPORATE AUTHOR

HS-022 379

MANUAL ON IDENTIFICATION, ANALYSIS, AND CORRECTION OF HIGH ACCIDENT LOCATIONS

THE HIGH-ACCIDENT LOCATION ANALYSIS (HAL) SYSTEM IS USED FOR IDENTIFYING, ANALYZING, AND CORRECTING HIGH-ACCIDENT LOCATIONS. INSTRUCTIONS ARE PROVIDED IN EACH CHAPTER FOR THE ESTABLISHMENT AND TIMING OF PROCEDURES. WORKSHEETS ARE PROVIDED FOR MANY OF THE PROCEDURES. THE FOUR BASIC PROCESSES OF THE HAL SYSTEM INCLUDE SETTING UP THE TRAFFIC RECORDS SYSTEM (REPORTING, FILING, AND SUMMARIZING TRAFFIC ACCIDENT DATA), AND IDENTIFYING, ANALYZING, AND CORRECTING HIGH-ACCIDENT LOCATIONS. THE EARLY WARNING ANALYSIS AND THE ANNUAL CITY-WIDE ANALYSIS IDENTIFY LOCATIONS WITH LARGE NUMBERS OF TRAFFIC ACCIDENTS. THE LOCATIONAL ANALYSIS PROCEDURE IS OUTLINED, INCLUDING COLLISION DIAGRAMS, ON-SITE OBSERVATION, DETERMINATIONS OF GENERAL COUNTERMEASURES, AND CHECKING WARRANTS TO JUSTIFY THEIR IMPLEMENTATION, FOLLOWED BY DETERMINATION OF SPECIFIC COUNTERMEASURES. THE HAL SYSTEM PROVIDES FOR COST ANALYSIS OF IMPLEMENTED COUNTERMEASURES AND IMPROVEMENTS, AND FOR COMPUTATION OF THE COST/BENEFITS OF THE SYSTEM. INCLUDED IN THE APPENDICES ARE A TABLE OF GENERAL COUNTERMEASURES AND PROBABLE CAUSES FOR ACCIDENT PATTERNS, INSTRUCTIONS FOR TRAFFIC DATA COLLECTION (TURNING VOLUME COUNTS, SPOT SPEED STUDIES, ETC.), AND WARRANTS FOR FLASHING BEACONS, SAFETY LIGHTING, AND ONE-WAY STREETS. ESTIMATED COUNTERMEASURE COSTS, IMPROVEMENT SERVICE LIFE, AND COUNTERMEASURE ACCIDENT REDUCTIONS ARE ALSO TABULATED. A TABLE OF

INTEREST FACTORS, COMPOUNDED AT 5%, IS PROVIDED FOR IMPROVEMENT SERVICE LIFE.

by JERRY L. GRAHAM
MIDWEST RES. INST.
1975; 125P 39REFS
SPONSORED BY MISSOURI STATE HWY. COMMISSION, MISSOURI DIV. OF HWY. SAFETY, AND FEDERAL HWY. ADMINISTRATION.
Availability: CORPORATE AUTHOR

HS-022 380

HIGHWAY CONSTRUCTION ZONE SAFETY--NOT YET ACHIEVED

ALTHOUGH THE FEDERAL HWY. ADMINISTRATION HAS BEEN EMPHASIZING SAFETY IN HIGHWAY CONSTRUCTION SINCE 1966, THE HAZARDS FOUND BY THE GENERAL ACCOUNTING OFFICE (GAO) IN SEVEN OF THE 26 STATES VISITED INDICATE THAT EMPHASIS ON CONSTRUCTION SAFETY HAS NOT REACHED RESPONSIBLE OFFICIALS IN FIELD OFFICES AND STATE HIGHWAY AGENCIES. THE ADMINISTRATION HAS PROPOSED REGULATIONS, HAS UNDERTAKEN RESEARCH, HAS DEVELOPED AND SPONSORED TRAINING PROGRAMS, AND IS UPGRADING ITS MANUAL OF ACCEPTABLE TRAFFIC CONTROL DEVICES. THE GAO BELIEVES THAT THESE ACTIONS DO NOT ADDRESS ALL THE PROBLEMS OF HIGHWAY CONSTRUCTION SAFETY. THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES DOES NOT CONTAIN ENOUGH SPECIFIC GUIDANCE ON THE USE OF THESE DEVICES. PROCEDURES HAVE NOT BEEN DEVELOPED BY FIELD OFFICES FOR SCOPE AND FREQUENCY OF HIGHWAY CONSTRUCTION SITE INSPECTIONS. PLANNERS AND STATE AND FEDERAL PROJECT INSPECTORS NEED FURTHER TRAINING IN CONSTRUCTION ZONE SAFETY TECHNIQUES.

GENERAL ACCOUNTING OFFICE, WASHINGTON, D.C. 20548
Rept. No. CED-78-10; 1977; 41P
Availability: GENERAL ACCOUNTING OFFICE, DISTRIBUTION SECTION, P.O. BOX 1020, WASHINGTON, D.C. 20013 $1

HS-022 381

CORROSION INHIBITING RUBBER SEALS

A NEW OIL SEAL RUBBER COMPOUND HAS BEEN DEVELOPED WITH CONSIDERABLY IMPROVED GMRP (GENERAL MOTORS RES. ELASTOMER OIL SEAL SPECIFICATION) CORROSION RATING. THIS WAS ACHIEVED BY COMPOUNDING THE BASIC HYCAR 1042 ELASTOMER WITH COMPATIBLE CORROSION INHIBITOR, CAPABLE OF INHIBITING THE CORROSION PROCESS ON RUBBER-METAL INTERFACE. A CORNOX-13-A-II CORROSION INHIBITING SYSTEM WAS USED. THE METHOD EMPLOYED TO EVALUATE CORROSION RESISTANCE WAS THE GENERAL MOTORS ENGINEERING STANDARD GM-9003-P, WHICH CONSISTED OF COMPRESSING THE RUBBER SPECIMEN BETWEEN TWO METAL PLATES AND EXPOSING THE ALUMINUM, BRASS, AND BRONZE. HIGH DEGREE OF PROTECTION WAS ACHIEVED UNDER INCREASED TEMPERATURE AND HUMIDITY CONDITIONS, AND PROMISING RESULTS OBTAINED IN VARIOUS TEST FLUIDS INCLUDING COMMON OILS AND FUELS. THE NONCORROSIVE COMPOUND EXHIBITED GOOD COMPRESSION SET PROPERTIES. THE PROPOSED FORMULA IS ACCEPTABLE FOR IN-PLANT USE, BEING NONTOXIC AND NONFLAMMABLE. SEAL PERFORMANCE OF THE CORNOX SAMPLES WAS FOUND ACCEPTABLE. THE ADDITION OF THE CORROSION INHIBITOR ELIMINATES THE NEED FOR RECOMPOUNDING TO MEET GMRP CORROSION REQUIREMENTS.

by B. A. MIKSIC; W. G. LEVANS
NORTHERN INSTRUMENTS CORP.; GARLOCK, INC.
Rept. No. SAE-770174; 1977; 8P 4REFS
PRESENTED AT INTERNATIONAL AUTOMOTIVE ENGINEERING CONGRESS AND EXPOSITION, DETROIT, 28 FEB-4 MAR 1977.
Availability: SAE

HS-022 382

GENERAL MOTORS STATIC ROLLOVER FIXTURE

THE GENERAL MOTORS (GM) STATIC ROLLOVER TEST FIXTURE, CONSTRUCTED IN ACCORDANCE WITH THE REQUIREMENTS OF FEDERAL MOTOR VEHICLE SAFETY STANDARD (FMVSS) 301, FUEL SYSTEM INTEGRITY, INCORPORATES SEVERAL UNIQUE DESIGN FEATURES WHICH MINIMIZE THE OVERALL TEST TIME AND REQUIRED MAN-HOURS AND ASSURES COMPLIANCE TO THE TEST PARAMETERS. THE PERMANENTLY LOCATED FIXTURE CONSISTS OF A ROTATING CARRIAGE SUSPENDED FROM TWO COMMERCIAL TRUCK LIFTS. AN ELECTRIC MOTOR WITH MECHANICAL SPEED REDUCTION DRIVES THE ROTATING CARRIAGE AT TWO MINUTES PER 90° OF ROTATION. THE ELECTROMECHANICAL SYSTEM PROVIDES A CONSTANT ROLL RATE AND EASY CONTROL OF THE STOP AND START FUNCTIONS. A PORTABLE CONTROL CONSOLE ALSO MONITORS THE FIXTURE AND TEST PARAMETERS. THE VEHICLE HOLD-DOWN SYSTEM SECURES THE VEHICLE FRAME OR RIGID UNDERBODY SECTION TO THE FIXTURE WITH THE SHIPPING HOOKS PROVIDED ON GM VEHICLES. POSTBARRIER TEST OPERATIONS ARE INCORPORATED INTO THE ROLLOVER PROCEDURES. THE FIXTURE HAS BEEN IN OPERATION SINCE NOV 1974 AND HAS PERFORMED SATISFACTORILY WITH ONLY MINOR REPAIR AND ROUTINE PERIODIC MAINTENANCE.

by CHARLES R. MEIN; ROBERT B. BALLMER
GENERAL MOTORS PROVING GROUND, SAFETY RES. AND DEVEL. LAB.
Rept. No. SAE-770173; 1977; 10P
PRESENTED AT INTERNATIONAL AUTOMOTIVE ENGINEERING CONGRESS AND EXPOSITION, DETROIT, 28 FEB-4 MAR 1977.
Availability: SAE

HS-022 383

EFFECT OF FOREIGN MATTERS ON SEALING CHARACTERISTICS OF OIL SEALS

TESTS WERE CONDUCTED TO DEMONSTRATE THE EFFECT OF FINE SOLID PARTICLES SUSPENDED IN A LUBRICATING OIL UPON THE SEALING CHARACTERISTICS OF OIL SEALS AND UPON THE EFFECTIVE LIFE OF THE SEALS. A SPECIMEN OIL SEAL WAS INSTALLED IN A BORE OF THE OUTER SHAFT HOUSING, AND WAS SUPPORTED BY TWO BALL BEARINGS INSERTED BETWEEN THE OUTER AND MAIN SHAFT HOUSING. THE GLASS SHAFT WAS DRIVEN BY A VARIABLE SPEED CHANGER, AND THE FRICTIONAL TORQUE MEASURED BY STRAIN GAUGES ON A LEAF SPRING. FRICTIONAL TORQUE AND LIP TEMPERATURES, MEASURED BY AN ALUMEL-CHROMEL THERMOCOUPLE, WERE RECORDED ON AUTO-BALANCE TYPE RECORDERS. TWO TYPES OF OIL SEALS WERE PREPARED, IDENTICAL TO THOSE USED ON AUTOMOBILES. THE SEAL LIP WAS MADE OF SILICON COMPOUND AND SAE 30 MOTOR OIL WAS USED FOR THE TEST FLUID, WITH THE OIL LEVEL KEPT AT CENTERLINE OF THE SHAFT. THE SEALING CHARACTERISTICS WERE TESTED ON WET FILTER PAPER TOUCHING THE SEAL LIP/SHAFT INTERFACE. THREE KINDS OF EXTERIOR DUST SEALS WERE TESTED. A DUST LIP OF NONWOVEN FABRIC AND A COMBINATION DUST LIP AND SIDE LIP WERE FOUND TO HAVE 100% SEALING RATES AFTER 600 HOURS, WHILE THE SEALING RATE OF A THIRD TYPE (GENERAL DUST LIP) WAS REDUCED TO 20% AFTER 450 HOURS. THE FIRST TWO SEALS ARE ALREADY IN USE IN AUTOMOBILES AND LEAKAGE HAS SIGNIFICANTLY DECREASED.

by HIROSHI HIRABAYASHI; TATSUAKI YUKIMASA; KAZUO UCHINO
NIPPON OIL SEAL INDUSTRY CO., LTD., JAPAN
Rept. No. SAE-770175; 1977; 12P 5REFS
PRESENTED AT INTERNATIONAL AUTOMOTIVE ENGINEERING CONGRESS AND EXPOSITION, DETROIT, 28 FEB-4 MAR 1977.
Availability: SAE

HS-022 384

A STUDY OF DUST COVER SEALS FOR BALL JOINT APPLICATION

DUST COVER SEAL DESIGN PARAMETERS FOR BALL JOINT ASSEMBLIES WERE TESTED BY LABORATORY SEALING PERFORMANCE TESTS AND BY A SURVEY OF FIELD OBSERVATIONS. SUCH PERFORMANCE CHARACTERISTICS OF DUST COVER SEALS AS NONINTERFERENCE WITH ADJACENT COMPONENTS, EFFECTIVE PROTECTION FROM DUST, WATER, ETC., AND DEFORMABILITY TO ACCOMMODATE MOVING PARTS, MUST BE MAINTAINED UNDER STATIC AND DYNAMIC CONDITIONS. TO PROVIDE THESE PERFORMANCE CHARACTERISTICS, THE DESIGN PARAMETERS MUST INCLUDE THE WORKING ENVELOPE (SPACE AVAILABLE FOR SEAL SIDEWALL), THE CONTACT FACE LOAD OF THE SEALING LIP, AND THE AXIAL REBOUND LOAD. LABORATORY TESTS MEASURED THE NUMBER OF CYCLES, THE TOTAL CYCLES, AND THE ANGLE OF OSCILLATING MOTION, AS WELL AS THE SPEED, TOTAL MOVEMENT, AND ANGLE OF ROTATIONAL MOVEMENT. SOME TESTS WERE CONDUCTED UNDER WET CONDITIONS. DUST IN THE LIP CONTACT AREA, WEAR IN THIS AREA, OR A CHANGE IN THE CONTACT FACE LOAD OR THE AXIAL REBOUND LOAD WERE INDICATIONS OF INADEQUATE COVER SEALS. THE OUTSIDE APPEARANCE OF THE SEAL WAS ALSO AN INDICATION OF ITS EFFECTIVENESS, CRACKS AND FISSURES INDICATING DETERIORATION OF THE MATERIAL. THE DESCRIBED PARAMETERS ARE USEFUL FOR SEAL DESIGN, AND PRESENT SEALS ARE ADEQUATE FOR THE WARRANTY PERIOD.

by HIROSHI HIRABAYASHI; KENICHI TERAI; AKIRA MATSUSHIMA
NIPPON OIL SEAL INDUSTRY CO., LTD., JAPAN; NOK-USA, INC., JAPAN
Rept. No. SAE-770176; 1977; 11P 5REFS
PRESENTED AT INTERNATIONAL AUTOMOTIVE ENGINEERING CONGRESS AND EXPOSITION, DETROIT, 28 FEB-4 MAR 1977.
Availability: SAE

HS-022 385

EXPERIMENTAL AND THEORETICAL ANALYSIS ON INDEPENDENT REAR SUSPENSION AND BODY STRUCTURE TO REDUCE INTERIOR NOISE

A THEORETICAL AND EXPERIMENTAL VIBRATION ANALYSIS WAS CARRIED OUT ON A VEHICLE EQUIPPED WITH INDEPENDENT REAR SUSPENSION IN AN EFFORT TO REDUCE INTERIOR NOISE. THE FACTORS CONTRIBUTING MOST TO VIBRATION INCLUDE COIL-SPRING LOCATION, DYNAMIC STIFFNESS OF MOUNTING INSULATOR, AND RIGIDITY OF SUSPENSION MEMBER AND OF BODY STRUCTURE WHERE THE SUSPENSION IS MOUNTED. INTERIOR NOISE WAS REDUCED IN A VEHICLE WITH A SEMI-TRAILING TYPE INDEPENDENT REAR SUSPENSION SYSTEM BY ADAPTING THE VIBRATION CHARACTERISTICS OF THE BODY AND SUSPENSION SYSTEM. DESIGN PARAMETERS FOR REDUCED INTERIOR NOISE SHOULD INCLUDE BRINGING RESONANCE POINTS OF THE SUSPENSION BEYOND THE RANGE OF PRACTICAL CAR SPEED, USING A LOW RIGIDITY SPRING AND INSULATOR (SOFT MOUNTING), AND MAKING THE SUSPENSION SYSTEM LESS RESPONSIVE BY USING THE WEIGHT OF THE VEHICLE'S COMPONENTS (NODAL MOUNTING). THE PARAMETERS HERE DESCRIBED APPLY ONLY TO REDUCED INTERIOR NOISE AND MAY REQUIRE ADJUSTMENT TO CONSIDERATIONS OF VEHICLE DESIGN, WEIGHT, COST EFFICIENCY, ETC. A NEW INDEPENDENT REAR SUSPENSION SYSTEM FOR THE DATSUN 810 IS A DIRECT RESULT OF THIS STUDY.

by MASAKATSU SANO; YASUHIKO FUJIWARA; ATSUYUKI NAKA
NISSAN MOTOR CO., LTD., JAPAN
Rept. No. SAE-770177; 1977; 15P 2REFS
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HS-022 386

THE APPLICATION OF HANDLING REQUIREMENTS TO AN RSV-TYPE VEHICLE

A STUDY WAS MADE TO SPECIFY, DEVELOP, AND TEST THE HANDLING CHARACTERISTICS OF A PROTOTYPE RESEARCH SAFETY VEHICLE. HANDLING REQUIREMENTS WHICH WERE USED TO EVALUATE THE TRANSIENT AND STEADY-STATE RESPONSE AND PERFORMANCE WERE BASED ON A REVIEW OF CONTEMPORARY RESULTS IN THE AREA OF HANDLING AND CONTROLLABILITY, AND THEY COMBINE VEHICLE PERFORMANCE ENVELOPES AND DRIVER-CENTERED CONSIDERATIONS. THE RESULTING CRITERIA ARE USED AS HANDLING OBJECTIVES IN THE TESTING AND EVALUATION OF A PROTOTYPE SMALL SEDAN. TESTS RESULTS SHOWED THAT THE PROTOTYPE VEHICLE MET, WITH MINOR EXCEPTIONS, ALL THE MAJOR HANDLING REQUIREMENTS AND DESIGN GOALS RECOMMENDED BY THE INTERNATIONAL TECHNICAL CONFERENCE ON EXPERIMENTAL SAFETY VEHICLES (IESV). THESE REQUIREMENTS INCLUDE YAW RESPONSE, RETURNABILITY (FEEDBACK), LATERAL ACCELERATION, CONTROL AT BREAKAWAY, AND DIRECTIONAL STABILITY TO CROSSWIND, STEERING CONTROL, AND PAVEMENT IRREGULARITY. OVERTURNING IMMUNITY, ENGINE RESPONSE TO LATERAL FORCE INFLUENCE, AND RIDE PERFORMANCE ARE ALSO SPECIFIED.

by DAVID H. WEIR; JOHN W. ZELLNER
SYSTEMS TECHNOLOGY, INC.
Rept. No. SAE-770178; 1977; 16P 21REFS
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HS-022 387

CHRYSLER CORPORATION'S ISOLATED TRANSVERSE TORSION BAR FRONT SUSPENSION

TO SATISFY THE OBJECTIVES OF CHRYSLER'S NEW GENERATION OF COMPACT VEHICLES, A UNIQUE FRONT SUSPENSION SYSTEM WAS CREATED WHICH HAS AN OUTSTANDING LEVEL OF RIDE COMFORT WHILE PROVIDING SIGNIFICANT ADVANTAGES IN THE BASIC VEHICLE PACKAGING AND THE ISOLATION OF NOISE. THE KEY TO THE SYSTEM IS THE TRANSVERSE TORSION BAR AND BUSHINGS WHICH SERVE THE DUAL FUNCTION OF SUSPENSION SPRING AND FORE AND AFT RESTRAINT FOR THE LOWER CONTROL ARM. PRODUCING THIS TORSION BAR IN MASS PRODUCTION REQUIRED ADVANCES IN BOTH ENGINEERING AND MANUFACTURING TECHNOLOGY. HAVING ALL THE SUSPENSION ATTACHMENTS ON ONE CROSSMEMBER PROVIDES FOR PLANT SIMPLIFICATION AND REDUCTION IN ASSEMBLY LABOR TIME, SINCE THE SUSPENSION SYSTEM AND THE CROSSMEMBER ARE BUILT AS A SUBASSEMBLY AND ATTACHED TO THE VEHICLE AS A UNIT. THE TORSION BAR FRONT SUSPENSION REQUIRES ONLY A LEFT AND A RIGHT TORSION BAR FOR THE COMPLETE LINE OF CHRYSLER VEHICLES AND OPTIONAL EQUIPMENT. A NEW DESIGN OF TORSION BAR ANCHOR HEX MAKES ASSEMBLY EASIE AND REDUCES SETTLING TENDENCIES. NEV TECHNIQUES OF SETTING CASTER AND CAMBE MINIMIZE LABOR TIME A.ID INCREASE RELIABIL TY. TOOLING COSTS HAVE BEEN REDUCED, SINCE NUMBER OF COMPONENTS ARE USED IN COMMO WITH OTHER CHRYSLER VEHICLES. AMONG THES COMPONENTS ARE LOWER AND UPPER BAL JOINTS, STEERING KNUCKLE, TIE ROD ENDS, AN IDLER ARM.

by CHRISTOPHER M. KENNEDY; JACK C. KERBY; JOHN A. MICHALOWICZ; ROBERT H. SMITH
CHRYSLER CORP.
Rept. No. SAE-770179; 1977; 12P
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HS-022 388

A MECHANISM OF DISC-BRAKE SQUEAL

THE PROCESS OF NOISE GENERATION IN A PIN-DIS SYSTEM IS EXAMINED AND THE RESULTS RELATE TO SQUEAL PRODUCED BY A DISC-BRAKE. TH RESULTS FROM THE PIN-DISK SYSTEM SUPPORT TH THEORY THAT THE GENERATION OF SQUEAL NOIS IN DISC-BRAKES IS CAUSED BY A GEOMETRICALL INDUCED OR KINEMATIC CONSTRAINT INSTABILIT THE UNSTABLE REGIONS ARE SHOWN TO BE DEPEN DENT ON THE COEFFICIENT OF FRICTION BETWEE THE INTERACTING SURFACES AND THE MAG NITUDES OF THE PHYSICAL PARAMETERS OF TH SYSTEM ELEMENTS. THE PIN-DISC SYSTEM IS CON SIDERED TO REPRESENT THE ESSENTIAL CHARAC TERISTICS OF A REAL DISC-BRAKE WITH REGARD T ITS MECHANISM OF SQUEAL NOISE GENERATION.

by S. W. E. EARLES
KING'S COLL., DEPT. OF MECHANICAL ENGINEERING, UNITED KINGDOM
Rept. No. SAE-770181; 1977; 8P 7REFS
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HS-022 389

BRAKING REGULATIONS FOR PASSENGER CARS

A SUMMARY OF WORLDWIDE PASSENGER CA BRAKING REGULATIONS REVEALS THAT TWO STAN DARDS ARE BEING INCREASINGLY ADOPTED: TH USA FEDERAL STANDARD 105-75 AND THE COMMO MARKET EUROPEAN ECONOMIC COMMUNITY (EE DIRECTIVE 71/320 (EQUIVALENT TO UNITED NATION ECONOMIC COMMISSION FOR EUROPE (ECE) REGU LATION 13). RECENT AMENDMENTS OF THESE TW IMPORTANT REGULATIONS ARE CRITICALL REVIEWED, WITH SPECIAL EMPHASIS ON THE EU ROPEAN VEHICLE STABILITY AND ADHESIO UTILIZATION PRESCRIPTIONS. SUPPLEMENTAR COMPARISONS BETWEEN THE USA AND EUROPEA BRAKING REGULATIONS INCLUDE ANALYSES C THE CORRESPONDING TEST PROCEDURES, WHIC

MAY BENEFIT THE HARMONIZATION STUDIES INITIATED BY THE ECE GOVERNMENT EXPERTS IN GENEVA. AMONG THE BRAKING REGULATIONS COMPARED ARE STOPPING DISTANCES, EMERGENCY BRAKE PERFORMANCE (PARTIAL FAILURE OR INOPERATIVE POWER/ASSIST), AND BRAKE FADE. USA TEST PROCEDURES INCLUDE BURNISHING, TWO FADE RECOVERY TESTS AND A WATER RECOVERY TEST, ADDITIONAL SERVICE BRAKE EFFECTIVENESS TESTS, AND SPIKE STOPS WITHIN A CLEARLY DEFINED SEQUENCE AND PROCEDURE. THE EEC PROCEDURE INCLUDES ADDITIONAL EMERGENCY BRAKE AND ENGINE-CONNECTED TESTS, HOT EFFECTIVENESS AND REACTION TIME MEASUREMENTS, AND A DYNAMIC PARKING BRAKE STOP. THE SWEDISH PROCEDURE ADDS THE WHEEL-LOCK TEST AND A STATIC SYSTEM STRENGTH CHECK. USA CONSTRUCTION SPECIFICATIONS CALL FOR EXTRA WARNING INDICATORS FOR ELECTRICAL ANTILOCK/APPORTIONING FAILURES, CENTRAL HYDRAULIC FAILURE, AND "PARKING BRAKE APPLIED" CONDITIONS. THERE ARE ALSO SPECIFICATIONS FOR FLUID RESERVIOR CAPACITY, FOR BRAKE HOSE LABELING, AND FOR BRAKE FLUIDS. THERE ARE STATE LAWS ON LINING MATERIAL APPROVAL AND ON DISC/DRUM MACHINING MARKING. EUROPEAN REGULATIONS PROHIBIT "DORMANT DEVICES" WHOSE FAILURE MIGHT PASS UNNOTICED, AND THEY DEMAND TRANSPARENT BRAKE FLUID RESERVOIRS. SWEDEN HAS PRESCRIPTIONS FOR BRAKE PIPE CORROSION RESISTANCE AND FOR AUTOMATIC BRAKE ADJUSTMENT OR LINING WEAR INDICATOR.

by PAUL OPPENHEIMER
GIRLING LTD., ENGLAND
Rept. No. SAE-770182; 1977; 18P 10REFS
PRESENTED AT INTERNATIONAL AUTOMOTIVE ENGINEERING CONGRESS AND EXPOSITION, DETROIT, 28 FEB-4 MAR 1977.
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HS-022 390

THE GIRLING COLETTE DISC BRAKE

THE DEVELOPMENT OF SEALED SLIDING CALIPER SYSTEMS IS TRACED, IN THE EFFORT TO MEET CHANGING MARKET REQUIREMENTS FOR DISC BRAKES. DISC BRAKES MUST MEET NEW REGULATIONS IMPOSING HIGHER STANDARDS OF BRAKING PERFORMANCE AND STABILITY, NEW CAR CONCEPTS SUCH AS FRONT WHEEL DRIVE, AND NEW AXLE AND WHEEL DESIGNS WHICH LIMIT SPACE FOR BRAKE INSTALLATION. LONGER WARRANTY PERIODS AND INTERVALS BETWEEN BRAKE SERVICING, REQUIREMENTS FOR COST AND WEIGHT REDUCTIONS, AND MORE STRINGENT TEST SPECIFICATIONS ALSO AFFECT DISC BRAKE DESIGN. AMONG THE TECHNICAL FACTORS AFFECTING BRAKE SELECTION ARE NEW INSTALLATION CONDITIONS IMPOSED BY MODIFIED AXLE ARRANGEMENTS AIMED AT IMPROVED VEHICLE STABILITY. OTHER FACTORS INCLUDE FLUID VAPORIZATION, KNOCK BACK/PEDAL TRAVEL VARIATIONS, VIBRATIONS, CORROSION/DIRT, AND PAD RELEASE. THE MAJOR PROBLEM AREAS OF OPPOSED PISTON CALIPERS ARE INSTALLATION, FLUID TEMPERATURE, AND PEDAL TRAVEL VARIATION. THE FRAME TYPE CALIPER SOLVES THE MAJOR PROBLEM AREAS OF THE OPPOSED PISTON CALIPER, BUT REQUIRES THICKER STEEL OR SG IRON YOKES AT CONSIDERABLY INCREASED COST. PLATE TYPE CALIPERS ARE EXTREMELY PRONE TO NOISE. FIST TYPE CALIPERS WITH OPEN SLIDING ARRANGEMENTS ARE THE PREFERRED DESIGN IN THE U.S., BUT THESE HAVE THE PROBLEMS OF PEDAL TRAVEL VARIATION "KNOCK BACK," WEAR ON THE SLIDING ARRANGEMENT AND RATTLE NOISE, AND EXCESSIVE AND UNEQUAL WEAR ON LININGS AND DISCS. THESE PROBLEMS CAN BE SOLVED WITH A SEALED SLIDING ARRANGEMENT SUCH AS THE COLETTE CALIPER, WHICH HAS ALREADY BEEN INSTALLED AS ORIGINAL EQUIPMENT IN RENAULT, SEAT, LANCIA, AND LOTUS CARS, AND IN HONDA MOTORCYCLES. TO OFFSET A SMALL SPACE PENALTY, THE REDUCED RESIDUAL DRAG OF THESE CALIPERS REDUCES LINING WEAR AND GASOLINE CONSUMPTION.

by H. RATH; S. MICKE
GIRLING CONTINENTAL OPERATIONS
Rept. No. SAE-770183; 1977; 15P
PRESENTED AT INTERNATIONAL AUTOMOTIVE ENGINEERING CONGRESS AND EXPOSITION, DETROIT, 28 FEB-4 MAR 1977.
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HS-022 391

DEVELOPMENT OF A LIGHTWEIGHT SMALL CAR DISC BRAKE SYSTEM FOR INTERNATIONAL USAGE

THE BENDIX SERIES IV DISC BRAKE WAS DESIGNED TO PROVIDE WEIGHT SAVINGS AND MATERIAL CONSERVATION, AND HAS ALSO PROVIDED LONG LINING LIFE THROUGH LOW AND EQUAL SLIDING FORCES ON THE LININGS AND THROUGH RAPID COOLING. THE SERIES IV FLOATING HEAD DISC BRAKE IS MOUNTED DIRECTLY TO THE STEERING KNUCKLE, USING TWO BOLTS WHICH EXTEND THROUGH SLEEVES WITHOUT REQUIRING THE TRADITIONAL BRAKE ANCHOR PLATE, THUS SAVING BOTH WEIGHT AND MATERIAL. FURTHER WEIGHT SAVINGS ARE ACHIEVED BY USE OF A TWO-PIECE CONSTRUCTION WHICH UTILIZES AN ALUMINUM HOUSING, AND SIMPLIFIES FRONT WHEEL BEARING, DISC AND LINING ASSEMBLY SERVICE OR REPLACEMENT. SINCE THE BRAKE FLOATS ON TWO SEALED AND LUBRICATED SLEEVES, THE BRAKE SLIDING FORCES DO NOT INCREASE THE SERVICE TIME OR EXPOSURE TO CORROSIVE ENVIRONMENTS, THUS ELIMINATING PROBLEMS DUE TO INCREASED SLIDING FORCES, WHICH OCCASIONALLY REQUIRE SERVICING. THE DESIGN HAS BEEN PRODUCED AND ACCEPTED BY CONSUMERS IN AUSTRALIA.

by ROBERT T. DUCHARME; VINCENT J. KEANE
BENDIX AUTOMOTIVE CONTROL SYSTEMS GROUP ENGINEERING; REPCO, PATONS BRAKE REPLACEMENTS DIV.
Rept. No. SAE-770184; 1977; 11P
PRESENTED AT INTERNATIONAL AUTOMOTIVE ENGINEERING CONGRESS AND EXPOSITION, DETROIT, 28 FEB-4 MAR 1977.
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HS-022 392

THE VOLKSWAGEN SAFETY STEERING COLUMNS FOR FORWARD CONTROL VEHICLES

THE APPLICATION OF SAFETY STEERING COLUMNS TO FORWARD CONTROL VANS ENABLES THESE VEHICLES TO COMPLY VOLUNTARILY WITH FEDERAL MOTOR VEHICLE SAFETY STANDARD (FMVSS) 203, IMPACT PROTECTION FOR DRIVER FROM STEERING CONTROL SYSTEM, AND FMVSS 204, STEERING CONTROL REARWARD DISPLACEMENT. THE MOST IMPORTANT COMPONENT OF THE COLUMN, THE YIELDING STRUT, CONNECTS THE UPPER STEERING COLUMN WITH THE FRONT WALL OF THE VEHICLE. THE ONE-WAY SLIP JOINT AT THE DASHBOARD IS DESIGNED TO SEPARATE AT PREDETERMINED LOAD LEVELS IN RESPONSE TO RADIAL FORCES ENCOUNTERED IN CRASHES OF FORWARD CONTROL VANS. A FLEXIBLE JOINT AT THE LOWER END OF THE STEERING WHEEL PERMITS VERTICAL ROTATION WHEN IMPACTED, AND THE UPPER STEERING COLUMN BRACKET IS DESIGNED TO FOLD, PERMITTING THE STEERING COLUMN TO MOVE FORWARD. THE SAFETY COLUMNS HAVE BEEN CRASH TESTED WITH VOLKSWAGEN (VW) TRANSPORTER VEHICLES AND HAVE BEEN DESIGNED FOR THE VW "LT." USE OF THE THREE-POINT RESTRAINT SYSTEM CONTINUES TO BE THE MOST IMPORTANT SINGLE DEVICE FOR MINIMIZATION OF INJURIES.

by JOACHIM POHL; ARIBERT KOLMS
VOLKSWAGENWERK AG, TRANSPORTER SAFETY TESTING DEPT., GERMANY.
Rept. No. SAE-770185; 1977; 6P
PRESENTED AT INTERNATIONAL AUTOMOTIVE ENGINEERING CONGRESS AND EXPOSITION, DETROIT, 28 FEB-4 MAR 1977.
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HS-022 393

THE ACCEPTABILITY OF CAR SEAT BELTS

A RESEARCH PROGRAM SOUGHT TO ESTABLISH WHY CAR SEATBELT USAGE RATES SELDOM EXCEED 37% OVERALL. REACTIONS OF PEOPLE TO SEAT BELTS AND TO OTHER FORMS OF OCCUPANT RESTRAINT WERE ELICITED AND METHODS EXPLORED FOR INCREASING SEATBELT USAGE. ALTHOUGH THE GENERAL OPINION OF THE SAFETY VALUE OF SEAT BELTS IS FAVORABLE, THERE IS OBVIOUSLY INTERFERENCE WHICH PREVENTS SEATBELT USE BY SUCH FACTORS AS SPECIFIC CONDITIONS OF JOURNEY, VEHICLE, OR PERSON, DISCOMFORT OR INCONVENIENCE, AND LAZINESS OR FORGETFULNESS. AN INDEX OF BELT USE WAS DEVELOPED WHICH IDENTIFIED CONSISTENT USERS, INTERMITTENT USERS, AND CONSISTENT NONUSERS. USER EVALUATIONS WERE CONDUCTED OF TWO PROTOTYPE PASSIVE RESTRAINT SYSTEMS, ONE CONSISTING OF A LAP AND DIAGONAL SEAT BELT WITH ANCHORAGE POINTS ON THE VEHICLE DOOR, AND THE OTHER CONSISTING OF A PAD AND ARM MOUNTED ON THE VEHICLE'S TRANSMISSION VEHICLE USERS, ALTHOUGH NEITHER MET ALL THE IDEAL CRITERIA OF SAFETY, SIMPLICITY, RELIABILITY, LOW COST, AND USABILITY BY ALL VEHICLE OCCUPANTS. THE CHESTPAD SYSTEM WAS FELT TO MEET THE CRITERIA BETTER THAN THE PASSIVE BELT SYSTEM. AMONG THE METHODS CONSIDERED FOR INCREASING SEATBELT USE, WERE DESIGN IMPROVEMENTS, PUBLICITY CAMPAIGNS, FURTHER DEVELOPMENT OF PASSIVE RESTRAINTS, INSTALLATION OF REMINDERS OF INTERLOCK SYSTEMS, AND LEGISLATION FOR COMPULSORY SEATBELT USE. LEGISLATION IS THE ONLY METHOD TO RESULT IN 100% USAGE, WITH THE OTHER METHODS CONTRIBUTING ONLY MARGINALLY. LEGISLATION IS NOT RECOMMENDED AS AN INSTANT, AUTOMATIC, AND ISOLATED REMEDY; THE OTHER METHODS ARE IMPORTANT STEPS TOWARD THE GOAL OF INCREASED SEATBELT USAGE.

by I. A. R. GALER
UNIVERSITY OF TECHNOLOGY, INST. FOR CONSUMER ERGONOMICS, UNITED KINGDOM
Rept. No. SAE-770186; 1977; 10P 12REFS
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HS-022 394

AN EMPIRICAL APPROACH TO MOTORCYCLE SILENCING

A SIMPLE, INEXPENSIVE SYSTEM OF MOTORCYCLE SILENCING HAS GIVEN SUCCESSFUL RESULTS ON PROTOTYPE AND PRODUCTION TWO-STROKE AND FOUR-STROKE MACHINES FOR TOURING OR FOR COMPETITION. THE DOMINANT NOISE SOURCES WERE FOUND TO INCLUDE EXHAUST, CARBURETOR INTAKE, EXPANSION CHAMBER, ENGINE COOLING FINS, GEAR BOX, AND PRIMARY AND FINAL DRIVE CHAINS, IN GENERAL DESCENDING ORDER OF IMPORTANCE. AN EXHAUST SILENCER REDUCED THE NOISE FROM THIS SOURCE BY 25 DBA. AN ANNULAR CAVITY INTAKE SILENCER WAS DEVISED FOR THE CARBURETOR INTAKE WHICH WAS CONSIDERED A SUCCESSFUL FIRST ATTEMPT. PACKING RUBBER DISCS BETWEEN THE CYLINDER FINS AT HIGH AMPLITUDE POINTS REDUCED RINGING AND ALSO RADIATOR EFFICIENCY. SILENCER DEVELOPMENT, PARTICULARLY WITH LOW-LOSS ANNULAR CAVITY AND TUNED SIDE-CAVITY UNITS RESULTED IN A POWER INCREASE IN THE GREEVES MACHINE TESTED, WHILE PROVIDING A 12-25 DBA REDUCTION IN NOISE. THE PROCEDURE FOR TUNING IS DISCUSSED, USING THE CASE HISTORY OF A 380 CC TWO-STROKE ENDURO MOTORCYCLE.

by G. E. ROE
UNIVERSITY OF MANCHESTER, SIMON ENGINEERING LABS., ENGLAND
Rept. No. SAE-770188; 1977; 16P 7REFS
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HS-022 395

COMFORT AND CONVENIENCE IMPROVEMENTS TO INCREASE SAFETY BELT UTILIZATION

PASSIVE SEATBELT SYSTEMS WOULD INCREASE USE OF THE RESTRAINTS AND THUS INCREASE SAFETY. AMONG THE PASSIVE BELT SYSTEMS CONSIDERED ARE THE SLIDING TRACK SYSTEM, THE CORD OPERATED SYSTEM, THE ROTATING ARM SYSTEM, AND THE SEAT MOUNTED SYSTEM. ALL OF THESE ARE MOTORIZED AND ARE NORMALLY CONTROLLED BY A DOOR SWITCH. THESE ARE NOT SUITABLE FOR WIDESPREAD USE, DUE TO HIGH INSTALLATION COST AND UNSUITABILITY FOR SOME KINDS OF OCCUPANTS: CHILDREN, THE ELDERLY, AND THE INFIRM. A NONMOTORIZED PASSIVE RESTRAINT SYSTEM SIMILAR TO THAT OFFERED BY VOLKSWAGEN INCLUDES A SINGLE DIAGONAL BELT AND A PADDED KNEE RESTRAINT. IN A SEMIPASSIVE SYSTEM, THE BELT AUTOMATICALLY ENCIRCLES THE OCCUPANT AFTER ENTRY BUT THE FINAL ACTION IS MANUAL. THIS SYSTEM IS ADAPTED TO BUCKET SEATS AND IS LOW IN COST. DISADVANTAGES INCLUDE THE APPEARANCE OF THE STOWED BELTS AND DISCOMFORT TO THE OCCUPANT WHEN LEANING FORWARD. THE MORE SOPHISTICATED TYPE OF PASSIVE SYSTEM WOULD NOT OFFER THE CONSUMER GOOD VALUE FOR MONEY, THE CONTINUING UPGRADING OF ACTIVE SAFETY BELTS OR SIMPLE PASSIVE BELTS WOULD SERVE THE PUBLIC BETTER. INTELLIGENT PLACING OF THE WEBBING OF ACTIVE SEAT BELTS ON THE ANATOMY OF THE WEARER IS THE MOST IMPORTANT SINGLE FACTOR IN BOTH SAFETY AND COMFORT. INTEGRATING THE LAP AND SHOULDER BELTS WITH THE SEAT ELIMINATES SEAT ADJUSTMENT EFFECTS BUT PRESENTS ADDED WEIGHT DIFFICULTIES WITH THE SHOULDER BELT. CRITERIA ARE PRESENTED FOR INCREASING USER CONVENIENCE IN DONNING BELTS. ALTHOUGH THERE IS A TREND TOWARD SINGLE RETRACTOR SYSTEMS, THE TWO-RETRACTOR SYSTEM IS MORE CONVENIENT. SINCE THE PRESSURE EXERTED BY THE SHOULDER BELT IS FOUND TO BE THE MOST OBJECTIONABLE FEATURE TO SAFETYBELT USERS, TWO METHODS OF REDUCING THIS PRESSURE ARE BELT TENSION ELIMINATOR ("WINDOW SHADE" SYSTEM) AND BELT TENSION REDUCER ("COMFORT ZONE" EMERGENCY LOCKING RETRACTOR).

by CYRIL HENDERSON
AMERICAN SAFETY EQUIPMENT CORP.
Rept. No. SAE-770187; 1977; 18P 6REFS
PRESENTED AT INTERNATIONAL AUTOMOTIVE ENGINEERING CONGRESS AND EXPOSITION, DETROIT, 28 FEB-4 MAR 1977.
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HS-022 396

ABNORMAL COMBUSTION IN TWO-STROKE MOTORCYCLE ENGINES

WITH INCREASE IN DISPLACEMENT PER CYLINDER IN TWO-STROKE ENGINES, UNSTABLE ENGINE REVOLUTION AND CYLINDER NOISE DUE TO ABNORMAL COMBUSTION ARE COMMON. THESE CONDITIONS ARE ASSOCIATED WITH A LEAN AIR/FUEL MIXTURE. AN ANALYSIS IS PRESENTED OF THE CONTINUOUS WAVEFORM OF COMBUSTION PRESSURE, THE NATURE AND CAUSES OF ABNORMAL COMBUSTION ARE INVESTIGATED, AND AN EVALUATION IS MADE OF THE FEASIBILITY AND EFFECTIVENESS OF VARIOUS COUNTERMEASURES. THE ADOPTION OF NEW TESTING METHODS, SUCH AS THE JANTE METHOD OF EVALUATING SCAVENGED FLOW, HAS MADE IT POSSIBLE TO QUANTIFY SOME ASPECTS OF THE COMBUSTION MECHANISM. A MAJOR CAUSE OF ABNORMAL COMBUSTION IS POOR SCAVENGING. IMPROVEMENTS WERE ACHIEVED BY MODIFYING THE SCAVENGING PASSAGE CONSTRUCTION.

by TAKAHIKO AOYAMA; MASATO NAKAJIMA; MINORU ONISHI; SUSUMU NAGAHIKO
KAWASAKI HEAVY INDUSTRIES, LTD., JAPAN
Rept. No. SAE-770189; 1977; 16P 4REFS
PRESENTED AT INTERNATIONAL AUTOMOTIVE ENGINEERING CONGRESS AND EXPOSITION, DETROIT, 28 FEB-4 MAR 1977.
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HS-022 397

SUZUKI PRODUCTION ROTARY ENGINE, MODEL RE-5 FOR POWERING MOTORCYCLES

TECHNICAL DATA ARE PRESENTED ON THE DEVELOPMENT OF A ROTARY ENGINE FOR MOTORCYCLES, MODEL RE-5, WITH A PISTON DISPLACEMENT OF 497 CC IN A SINGLE ROTOR. SPECIFICATIONS ARE GIVEN FOR THE GENERAL LAYOUT, THE ROTOR HOUSING, THE TROCHOIDAL RUNNING SURFACE, AND THE ROTOR, SYNCHRONIZING GEARS, AND ECCENTRIC SHAFT. ALSO DESCRIBED ARE THE GAS SEALING AND INLET SYSTEMS, THE CARBURETOR, AND THE COOLING AND LUBRICATION SYSTEMS. AMONG THE SPECIAL FEATURES OF THE RE-5 ENGINE ARE THE STATIONARY GEAR DEVELOPMENT, OIL SEALING, AND THE ONE-PLUG IGNITION SYSTEM. A CONTINUING PROBLEM IS REDUCTION OF HYDROCARBON EMISSION WITHOUT SACRIFICING FUEL ECONOMY. ONE OUTSTANDING CHARACTERISTIC OF THIS ENGINE IS SMOOTH RUNNING.

by SHIGEYASU KAMIYA; SADAO SHIRASAGI
SUZUKI MOTOR CO., LTD.
Rept. No. SAE-770190; 1977; 20P 10REFS
PRESENTED AT INTERNATIONAL AUTOMOTIVE ENGINEERING CONGRESS AND EXPOSITION, DETROIT, 28 FEB-4 MAR 1977.
Availability: SAE

HS-022 398

DENTING PROPERTIES OF ALUMINUM AUTOBODY COMPONENTS

DYNAMIC DENTING TESTS WERE CONDUCTED ON ACTUAL AUTOBODY COMPONENTS AND ON SIMULATED PANELS FABRICATED FROM ALUMINUM AND STEEL SHEET AT IMPACT VELOCITIES OF 20 TO 125 MPH. THESE EXPERIMENTS GIVE ADDITIONAL EVIDENCE THAT DENT DEPTH IS A LINEAR FUNCTION OF IMPACT VELOCITY. THE BALL INDENTOR FIRED FROM AN AIR GUN IS A VERY SENSITIVE TEST

FOR DYNAMIC INDENTATION. IT CAN SENSE SMALL DIFFERENCES IN SHEET THICKNESS, E.G. 0.001 INCH, AS WELL AS DIFFERENCES IN YIELD STRENGTH ON THE ORDER OF PRODUCTION LOT VARIATIONS. NEAR THE THRESHOLD VELOCITY, ABOUT ZERO DENT DEPTH, THE EFFECT OF CROWN OR PANEL CURVATURE DOES NOT PLAY AS STRONG A ROLE IN AFFECTING THE DENT DEPTH AS IT DOES AT HIGHER VELOCITIES. INCREASES IN THICKNESS OF ALUMINUM SHEET TO ACCOMMODATE PROPERTY DIFFERENCES AND EQUALIZE DENT DEPTHS NEED NOT BE 50% GREATER THAN STEEL AS SUGGESTED BY OTHERS FROM STATIC LOADING TESTS. PRIMARY FACTORS TO BE CONSIDERED IN COMPARING DYNAMIC DENT RESISTANCE ARE SHEET THICKNESS, YIELD STRENGTH, MODULUS OF ELASTICITY, DENSITY, AND GEOMETRIC SHAPE.

by C. E. BURLEY; B. A. NIEMEIER
REYNOLDS METALS CO.
Rept. No. SAE-770199; 1977; 12P 4REFS
PRESENTED AT INTERNATIONAL AUTOMOTIVE ENGINEERING CONGRESS AND EXPOSITION, DETROIT, 28 FEB-4 MAR 1977.
Availability: SAE

HS-022 399

STRUCTURAL CHARACTERISTICS OF ALUMINUM BODY SHEET

THE INFLUENCE OF DENT RESISTANCE AND FLUTTER ON GAUGE SELECTION IN AUTOBODY APPLICATIONS IS DISCUSSED AND TEST DATA ARE PRESENTED. DATA FROM DEEP DENT TESTS OF MINIATURE HOODS ("MINIHOODS") WERE USED TO DEVELOP RELATIVE THICKNESS OF ALUMINUM AND STEEL FOR EQUAL DENT PERFORMANCE. THE RESULTS ARE TABULATED FOR VARIOUS ALLOYS. WHERE THE RATIO IS LESS THAN ONE, OTHER STRUCTURAL CRITERIA SUCH AS STIFFNESS MAY GOVERN GAUGE SELECTION. ALLOYS 6009-T4 AND 6010-T4 CAN BE AGED TO ACHIEVE HIGHER YIELD STRENGTHS THAN 2036-T4 AND 5182-0, PRESENTLY USED FOR BODY SHEET ALLOYS AND CAN THEREFORE BE USED IN THINNER GAUGES. THE DEPTHS OF DEEP DENTS VARIED INVERSELY AS THE PRODUCT OF THE THICKNESS OF THE MATERIAL AND THE YIELD STRENGTH. THRESHOLD ENERGY VARIED LINEARLY WITH THE THICKNESS AND APPROXIMATELY WITH THE SQUARE OF THE YIELD STRENGTH. DENT RESISTANCE WAS AFFECTED BY STIFFNESS OF THE PART AND THE RADIUS OF THE IMPACTING OBJECT. THE RELATIVE DENT RESISTANCE MEASURED ON MINIHOODS DIFFERED FROM THAT OF FLAT PANELS, DUE TO DIFFERENCES IN STIFFNESS AND TO STRETCH INTRODUCED INTO THE MINIHOODS. VIBRATION TESTS SHOWED THAT ALL PANELS, ALUMINUM AND STEEL, HAD ESSENTIALLY THE SAME FREQUENCY. THE RESPONSE OF STEEL AND ALUMINUM MINIHOODS TO FORCED DISPLACEMENT VIBRATION WAS ESSENTIALLY THE SAME. THEREFORE, FLUTTER SHOULD NOT BE AN IMPORTANT FACTOR IN GUAGE SELECTION FOR BODY SHEET APPLICATION.

by R. L. ROLF; M. L. SHARP; H. H. STROEBEL
ALUMINUM CO. OF AMERICA, ALCOA TECHNICAL CENTER
Rept. No. SAE-770200; 1977; 16P 10REFS
PRESENTED AT INTERNATIONAL AUTOMOTIVE ENGINEERING CONGRESS AND EXPOSITION, DETROIT, 28 FEB-4 MAR 1977.
Availability: SAE

HS-022 400

A HIGHLY FORMABLE ALUMINUM ALLOY--5182-SSF

THE BEST COMBINATION OF STRENGTH AN FORMABILITY OF ANY ALUMINUM ALLOY FOR US IN MOTOR VEHICLES IS OFFERED BY THE 5000 SE RIES (ALUMINUM-MAGNESIUM) ALLOYS CONTAIN ING 4% TO 5% MAGNESIUM, E.G. 5182. IN THE CON VENTIONAL ANNEALED STATE (-0 TEMPER) NECES SARY FOR MAXIMUM FORMABILITY, THIS ALLO SUFFERS FROM THE FORMATION OF TYPE A LUDE LINES (STRETCHER STRAINS) WHEN PLASTICALL DEFORMED A SMALL AMOUNT (LESS THAN 1% SUCH LUDER LINES ARE SIMILAR TO THOSE COM MONLY ENCOUNTERED IN STEEL AND ARE UNAC CEPTABLE IN OUTER PANELS. THE CONDITION UNDER WHICH LUDER LINES FORM ARE DISCUSSE THE INTRODUCTION OF 5182-SSF HAS COMPLETEL AVOIDED THESE PROBLEMS WITH A STRETCHE STRAIN FREE (SSF) MATERIAL WHICH EXCEEDS TH FORMABILITY OF 5182-0. TYPE B LUDER LINES CA BE PRODUCED IN 5182-SSF UNDER LABORATORY O UNUSUAL FORMING PRODUCTION CONDITION THESE CONDITIONS ARE SLOW STRAIN RATES AN UNIAXIAL STRESS STATES, BOTH OF WHICH AR NOT NORMALLY ENCOUNTERED IN ACTUA STAMPINGS. MOST PROPERTIES OF 5182-SSF ARE TH SAME AS THOSE OF 5182-0. THE ONLY IMPROVE PROPERTY WAS A REDUCED TENDENCY TO SOFTE DURING EXPOSURE TO PAINT-BAKE TEMPERATURE

by DAVID S. THOMPSON
REYNOLDS METALS CO.
Rept. No. SAE-770203; 1977; 14P 9REFS
PRESENTED AT INTERNATIONAL AUTOMOTIVE ENGINEERING CONGRESS AND EXPOSITION, DETROIT, 28 FEB-4 MAR 1977.
Availability: SAE

HS-022 401

ALUMINUM PRETREATMENT TO IMPROVE RESISTANCE SPOT WELD TIPLIFE

THE SURFACE CONTACT RESISTANCE OF AL MINUM CAN BE STABILIZED IN A SUITABLE MICR OHM RANGE; THIS WILL PROLONG TIPLIFE DURIN SPOT WELDING. ALLOYS 2036-T4 AND 5182-0 WER PROCESSED TO GIVE 75 MICRO-OHM SURFACE R SISTANCE THAT WOULD REMAIN STABILIZED FO STORAGE TIMES OF AT LEAST TEN WEEKS. TH

THE FINAL STEP WAS A STABILIZATION PROCESS CONSISTING OF A BRIEF DIP IN MILDLY ALKALINE STEARATE SOLUTION, WHICH PRODUCED A REACTED MONOLAYER OF STEARATE ABOVE THE EXISTING OXIDE. THE STEARATE MONOLAYER STABILIZES THE CONTACT RESISTANCE, PRESUMABLY BY PREVENTING FURTHER OXIDE FILM-FORMING REACTIONS.

by G. A. DORSEY, JR.; F. E. GIBBS
KAISER ALUMINUM AND CHEMICAL CORP.
Rept. No. SAE-770204; 1977; 14P 12REFS
PRESENTED AT INTERNATIONAL AUTOMOTIVE ENGINEERING CONGRESS AND EXPOSITION, DETROIT, 28 FEB-4 MAR 1977.
Availability: SAE

HS-022 402

SPRINGBACK CONSIDERATIONS IN FORMING ALUMINUM

SPRINGBACK FROM TENSION LOADING HAS BEEN QUANTITATIVELY ASSESSED FOR 5182 ALUMINUM ALLOY AFTER VARIOUS PERCENTS OF ROLLING REDUCTION. ALUMINUM ALLOYS 5182-H140, 2036-T4, X7046-T6, AND 1010-CQ STEEL AS COMMERCIALLY PRODUCED ALSO HAVE BEEN EVALUATED AND COMPARED IN RELATION TO SPRINGBACK, BOTH IN TENSILE AND BENDING SITUATIONS. LAWS OF PLASTICITY ARE USED TO DEVELOP STRESS AND INCORPORATED WITH LAWS OF ELASTICITY TO CALCULATE RECOVERY STRAIN AND OVERBEND ANGLE. FORMULATIONS ARE GIVEN TO COMPUTE SPRINGBACK STRAIN AND SPRINGBACK ANGLE. THE MODULUS OF ELASTICITY, STRENGTH COEFFICIENT, AND STRAIN HARDENING EXPONENT ARE FOUND TO BE USEFUL IN CALCULATING SPRINGBACK.

by B. A. NIEMEIER
REYNOLDS METALS CO.
Rept. No. SAE-770205; 1977; 8P 13REFS
PRESENTED AT INTERNATIONAL AUTOMOTIVE ENGINEERING CONGRESS AND EXPOSITION, DETROIT, 28 FEB-4 MAR 1977.
Availability: SAE

HS-022 403

WARM FORMING HIGH-STRENGTH ALUMINUM AUTOMOTIVE PARTS

LABORATORY MEASUREMENTS AND PLANT TRIALS WERE UNDERTAKEN TO DEMONSTRATE THAT IT IS POSSIBLE TO WARM FORM HIGH STRENGTH ALUMINUM SHEETS INTO COMPLEX PARTS. PRESS FORMING OF WORK-HARDENED OR AGE-HARDENED ALUMINUM ALLOY SHEET AT 100°-300° C IS IMPORTANT IN ELIMINATING THE HEAT TREATMENT OF THE FORMED PARTS, WHICH REQUIRES ADDITIONAL TIME, HANDLING, AND HEAT-TREATING FACILITIES. BY CONTROLLING THE TIME AND TEMPERATURE OF FORMING BELOW CONDITIONS PRODUCING RECRYSTALLIZATION OR OVERAGING, THE FORMABILITY IS SIGNIFICANTLY ENHANCED WHILE A HIGH ROOM TEMPERATURE TENSILE STRENGTH IS MAINTAINED. THE OPTIMUM FORMING TEMPERATURE FOR AGE-HARDENED ALLOYS WAS FOUND TO BE 200° C, EXCEPT FOR STRETCH FORMING. FOR WORK HARDENED ALUMINUM-MAGNESIUM ALLOYS, THE OPTIMUM TEMPERATURE WAS FOUND TO BE 250° C, WHICH PRODUCED A MARKED DECREASE IN TENSILE ELONGATION WITH STRAIN RATE. HIGH STRAIN RATE PRESS BEHAVIOR CANNOT BE ACCURATELY PREDICTED DUE TO DECREASE IN STRAIN RATE SENSITIVITY, CHANGE IN FRACTURE MODE, AND ADIABATIC HEATING DURING FORMING. SINCE FORMABILITY DECREASES RAPIDLY WITH DECREASING TEMPERATURE, A RESIN BASE INSULATIVE LUBRICANT WAS USED TO REDUCE THE RATE OF COOLING IN THE DIES. A PILOT LINE EVALUATION REMAINS TO BE PERFORMED BEFORE WARM STAMPED ALUMINUM IS A COMMON PRODUCTION PRACTICE.

by LARRY R. MORRIS; ROBERT A. GEORGE
ALUMINUM CO. OF CANADA; CHRYSLER CORP.
Rept. No. SAE-770206; 1977; 11P 6REFS
PRESENTED AT INTERNATIONAL AUTOMOTIVE ENGINEERING CONGRESS AND EXPOSITION, DETROIT, 28 FEB-4 MAR 1977.
Availability: SAE

HS-022 404

INSPECTION FOR DEFECTS ON ALUMINUM BODY SHEET

VISUAL INSPECTION DIFFICULTIES WITH ALUMINUM PANELS ARE DESCRIBED AND AN ASSEMBLY LINE TECHNIQUE SUGGESTED WHICH WILL CORRECT THESE DIFFICULTIES. CONSTANT LIGHTING CONDITIONS WHICH ELIMINATE SUCH DISTRACTIONS AS SHADOWS, REFLECTIONS, AND CONTRAST DIFFERENCES ARE NECESSARY FOR VISUAL INSPECTION. SCREENING OUT SHOP LIGHTING CAN ELIMINATE MOST OF THESE PROBLEMS. A SPECIAL LIGHT FIXTURE WITH CONTROLLED INTENSITY IS DESIGNED TO AID IN INSPECTION OF ALUMINUM PANELS, WHICH ARE MORE SUSCEPTIBLE TO GLARE THAN STEEL. ADVANTAGES OF THE LIGHT FIXTURE INCLUDE ELIMINATION OF THE NEED FOR HI-LITING OIL, INSENSITIVITY TO VIEWING ANGLE, AND DIRECT VIEWING RATHER THAN IMAGE DISTORTION DETECTION OF FLAWS. THIS INSPECTION SYSTEM CAN BE ADAPTED FOR STEEL PANELS WITH A SLIGHT INCREASE IN ILLUMINANCE. THE COST IS ESTIMATED AT NO MORE THAN $500 AND INSTALLATION ON AN ASSEMBLY LINE SHOULD PRESENT NO DIFFICULTIES.

by RONALD A. HOLT
ALUMINUM CO. OF AMERICA, ALCOA CENTER, PA. 15069
Rept. No. SAE-770207; 1977; 8P 3REFS
PRESENTED AT INTERNATIONAL AUTOMOTIVE ENGINEERING CONGRESS AND EXPOSITION, DETROIT, 28 FEB-4 MAR 1977.
Availability: SAE

HS-022 405

OBSERVATIONS ON SPOT WELDING ALUMINUM FOR AUTOMOTIVE APPLICATIONS

THE FOLLOWING OBSERVATIONS WERE MADE DURING TIPLIFE TESTS IN SPOT WELDING MILL FINISH ALUMINUM ALLOYS. NUGGET-FORMATION QUALITY CAN BE MONITORED EFFECTIVELY AND NONDESTRICTIVELY BY USE OF A MOTION TRANSDUCER. INTERFACE DYNAMIC-RESISTANCE CAN BE MONITORED BY ELECTRODE TO ELECTRODE VOLTAGE DROP. CUMULATIVE DETERIORATION OF THE ELECTRODES CAN BE MEASURED SEMIQUANTITATIVELY BY MICROMETRIC PROFILE RECORDING. THESE TECHNIQUES PERMIT SHORT-RUN SCHEDULES FOR SCREENING THE EFFECTIVENESS OF SURFACE TREATMENTS. NUGGET SHEAR LOAD CAN BE ESTIMATED WHEN GAUGE, NUGGET DIAMETER, AND ULTIMATE TENSILE STRENGTH ARE KNOWN.

by R. D. DEWEY; R. S. MAPES
REYNOLDS METALS CO., METALLURGICAL RES. DIV.
Rept. No. SAE-770208; 1977; 12P 13REFS
PRESENTED AT INTERNATIONAL AUTOMOTIVE ENGINEERING CONGRESS AND EXPOSITION, DETROIT, 28 FEB-4 MAR 1977.
Availability: SAE

HS-022 406

MATERIALS '78. BODY AND CHASSIS [AUTOMOBILE]

STEEL SUPPLIERS HAVE REACTED TO THE NEED FOR VEHICLE WEIGHT REDUCTION IN ORDER TO SAVE FUEL BY NEW TECHNOLOGY; STEEL STILL ACCOUNTS FOR OVER 80% OR MORE OF THE AVERAGE PRODUCTION VEHICLE BODY. A NUMBER OF NEW STEELS HAVE BEEN INTRODUCED WHICH ARE LIGHTER IN WEIGHT, HIGHLY CORROSION RESISTANT AND OF HIGH STRENGTH, AND HAVE EXCELLENT FORMABILITY. HIGH-STRENGTH STEEL CAN BE CATEGORIZED AS FOLLOWS: ACCELERATED AGING GRADES IN THE RENITROGENIZED OR REPHOSPHORIZED CATEGORIES; HIGH-STRENGTH LOW-ALLOY STEELS (HSLA); "ULTRA-HIGH STRENGTH" STEELS, THAT INCLUDE THE MARTENSITIC STEELS, THE SPECIALLY PROCESSED HSLA STEELS, AND FULL HARD COLD-ROLLED STEEL; AND HEAT-TREATABLE (BY NITRIDING) INTERSTITIAL FREE STEEL (IF-HT). ALSO, SINGLE-SIDED AND DOUBLE-SIDED GALVANIZED BODY STEELS ARE USED, PRIMARILY IN AREAS EXPOSED TO HIGH CORROSION LEVELS. ANOTHER MATERIAL WHICH IS BEING USED FOR WEIGHT REDUCTION AND CORROSION RESISTANCE IS ALUMINUM; ONE OUT OF EVERY THREE CARS NOW CARRIES AN ALUMINUM BUMPER. TEST TRACK RESULTS HAVE INDICATED THAT ALUMINUM ALLOYS USED IN BODY BUILDING PERFORM EQUIVALENTLY TO THE BEST STEELS AVAILABLE TODAY. THE INTRODUCTION OF THE BODIES. THE MAJORITY OF THE 1978 MODELS HAVE A METAL BUMPER SYSTEM WITH A SINGLE PIECE, ALL PLASTIC GRILLE, SURROUND HEADLIGHT MOUNT, AND FRONT FENDER EXTENSION. THESE PARTS ARE PRIMARILY FORMED FROM SMC (SHEET MOLDING COMPOUND) BUT ARE ALSO INJECTION MOLDED. ONE BODY COMPONENT WHICH SEEMS AN EXCELLENT CANDIDATE FOR FUTURE PLASTIC FABRICATION IS THE DOOR. STRUCTURAL FOAM OFFERS THE MOST EFFICIENT AND ECONOMICAL METHOD TO GAIN HIGH STRENGTH AND RIGIDITY IN LARGE STRUCTURAL PARTS. THE PROCESS CORRESPONDS TO INJECTION MOLDING.

by WESLEY A. WATERS
AUTOMOTIVE INDUSTRIES V157 N9 P35-9 (1 DEC 1977) 1977
SEE ALSO HS-022 407--HS-022 409.
Availability: SEE PUBLICATION

HS-022 407

MATERIALS '78. ENGINES, TRANSMISSIONS AND DRIVE TRAIN [AUTOMOBILE]

ONE OF THE LARGEST POTENTIAL GROWTH AREAS FOR A MATERIAL IN THE ENGINE AND DRIVE TRAIN IS CASTINGS, AND ALUMINUM IS THE REAL FACTOR. IN ADDITION TO INTAKE MANIFOLDS AND CYLINDER HEADS, BRAKE DRUMS AND DIFFERENTIAL CARRIERS ARE AMONG THE FUTURE CANDIDATES FOR ALUMINUM CASTINGS. ALUMINUM INTAKE MANIFOLDS ARE ALREADY BEING INCREASINGLY USED. WITH THE DESIRE TO GET NEW ALUMINUM CASTING APPLICATIONS ONSTREAM QUICKLY, SEMIPERMANENT MOLDING IS AN ATTRACTIVE APPROACH. LATER, HOWEVER, DIE CASTING IS EXPECTED TO TAKE OVER IN MOST HIGH VOLUME APPLICATIONS. BESIDES ALUMINUM USE IN CASTINGS, ALUMINUM SHEET, FOR EXAMPLE, IS USED IN AIR CLEANERS. MEANWHILE, THE STEEL MANUFACTURERS ARE IMPROVING THEIR PRODUCTS AND PROMOTING HIGH-STRENGTH STEELS FOR BRACKETS, ENGINE MOUNTS, AND OTHER KEY APPLICATIONS SUCH AS STAMPED PRODUCTS (ROCKER ARMS, ENGINE BELLHOUSINGS). STAINLESS STEEL HAS BEEN USED FOR EXHAUST SYSTEMS FOR THE LAST FEW YEARS, AND WORK IS GOING ON WITH CHROMIUM-DIFFUSED STEELS FOR THE SAME APPLICATION. FIBER GLASS HAS BEEN WIDELY APPLIED IN ENGINES AND DRIVE TRAINS IN 1978 MODELS. A PARTICULARLY PROMISING MATERIAL IN THE REINFORCED PLASTICS AREA IS GRAPHITE FIBER. THE GRAPHITE-REINFORCED DRIVE SHAFT SHOWS PARTICULAR PROMISE, SINCE IN ADDITION TO SAVING WEIGHT, IT PERFORMS BETTER BY REDUCING THE WHIPPING EFFECT COMMON TO STEEL DRIVE SHAFTS. ULTIMATELY A HYBRID APPROACH, PERHAPS GLASS AND GRAPHITE, WOULD BE LOGICAL IN MANY APPLICATIONS. ONE PROMISING APPLICATION OF NONREINFORCED PLASTICS IS IN FUEL TANKS. THE ELUSIVE

GOAL, THE ALUMINUM RADIATOR, IS CLOSER TO HIGH VOLUME PRODUCTION, AIDED BY PLASTIC.

by RICHARD J. FOSDICK
Publ: AUTOMOTIVE INDUSTRIES V157 N9 P47-51 (1 DEC 1977)
1977
SEE ALSO HS-022 406, HS-022 408, AND HS-022 409.
Availability: SEE PUBLICATION

HS-022 408

MATERIALS '78. SEALS AND TRIM [AUTOMOBILE]

THERE IS AN INCREASED USE OF BIMETALLICS SUCH AS STAINLESS STEEL AND ALUMINUM IN BODY TRIM, BEING MOST SUITABLE IN ROCKER MOLDINGS AND OTHER DIFFICULT TO VENT HIGHLY CORROSIVE AREAS. THE ALUMINUM TO STAINLESS MATERIAL IS PRODUCED BY A SHEET OF EACH BEING METALLURGICALLY ROLLED TOGETHER; THIS MATERIAL IS DESIGNED SUCH THAT THE ALUMINUM COMPONENT BECOMES THE SACRIFICIAL MATERIAL FACING THE ADVERSE ENVIRONMENTAL CONDITION. A STRONG, LIGHTWEIGHT, CHROME-PLATABLE ENGINEERING PLASTIC THAT MEETS ALL AUTOMOTIVE DEMANDS HAS BEEN DEVELOPED BY ALLIED CHEMICAL AND IS CALLED CAPRON XPN-1030 NYLON. APPLICATIONS REQUIRING HIGH STRENGTH AND HIGH THERMAL TOLERANCE SUCH AS SIDE-VIEW MIRRORS, WINDOW CRANKS, OR DOOR HANDLES THAT EXCEED ABS (ACRYLONITRILE-BUTADIENE-STYRENE) CAPABILITIES, AND WHICH COULD PREVIOUSLY BE SATISFIED ONLY BY METAL PARTS CAN NOW BE MADE USING XPN-1030 NYLON. GENERAL ELECTRIC'S NORYL RESIN HAS BEEN USED BY EVERY AUTOMOBILE MANUFACTURER IN THE U.S., OR BEEN SPECIFIED FOR FUTURE USE, IN WHEEL COVERS, HUBS, AND HUB CAPS. NORYL MOLDED WHEEL COVERS ARE EASILY RETAINED TO THE STEEL WHEEL BECAUSE OF THEIR LIGHT WEIGHT; ANOTHER ADVANTAGE OF NORYL IS ITS ABILITY TO BE DECORATED BY PAINTING OR PLATING. SOME EUROPEAN CARS ARE NOW RUNNING WITH ONE-PIECE DASH PANELS MOLDED OF NORYL. THE MOST EXCITING USE OF STRUCTURAL FOAM FOR 1978 IS IN THE FORD CL-9000 TRUCK WHERE THE INSTRUMENT PANEL CONSISTS OF A TALC-FILLED POLYPROPYLENE FOAM CONSTRUCTION MADE UP OF 12 SEPARATE MOLDINGS. PLASTICS ARE ALSO BEING APPLIED IN THE FIRST OPTICALLY CLEAR HEADLIGHT DOOR COVERS ON A PRODUCTION CAR (THE 1978 DODGE MAGNUM XE). OVER THE NEXT FIVE YEARS ELASTOMERIC REQUIREMENTS WILL PRESENT A DRAMATIC CHALLENGE TO THE RUBBER TECHNOLOGIST, DESIGN ENGINEER, AND POLYMER MANUFACTURERS. THE SPECIALTY ELASTOMERS WILL GAIN AN INCREASING SHARE OF THE MARKET. POLYACRYLATE, SILICONE, ETHYLENE/ACRYLIC, AND EVEN THE MORE EXPENSIVE FLUOROELASTOMERS WILL SUPPLANT NBR WHERE HEAT AND OIL RESISTANCE IS REQUIRED. THERE IS A BASIC TREND TOWARD MINIMIZING BODY TRIM, BOTH IN SIDE MOLDINGS AND MOLDED METAL INTERIOR BRIGHTWORK; BOTH COST AND WEIGHT ARE CRITICAL FACTORS IN DECIDING TO ELIMINATE PARTS. ALSO, EXTERIOR TRIM IS A MAJOR CAUSE OF CORROSION AND LESS DECORATIVE TRIM WILL PROBABLY BE USED IN THE FUTURE.

by WESLEY A. WATERS
Publ: AUTOMOTIVE INDUSTRIES V157 N9 P83-7 (1 DEC 1977)
1977
SEE ALSO HS-022 406, HS-022 407, AND HS-022 409.
Availability: SEE PUBLICATION

HS-022 409

MATERIALS '78. SUSPENSION AND STEERING [AUTOMOBILE]

MUCH OF THE ACTIVITY IN ALUMINUM CASTING FOUND IN THE ENGINE AND DRIVE TRAIN AREA CARRIES OVER INTO THE AREAS OF SUSPENSION, STEERING, AND BRAKING. CAST ALUMINUM BRAKE DRUMS ARE USED FOR SEVERAL OF GENERAL MOTORS' 1978 NEW DOWN-SIZED INTERMEDIATES AS WELL AS ALUMINUM BRAKE MASTER CYLINDERS. CHRYSLER IS USING AN ANODIZED CAST ALUMINUM BRAKE CYLINDER WITH A MOLDED PLASTIC FLUID RESERVOIR IN ITS ASPEN/VOLARE AND OMNI/HORIZON MODELS FOR 1978. PLASTICS ARE WORKING THEIR WAY INTO MORE BRAKE APPLICATIONS; CHRYSLER HAS BEEN USING PHENOLIC DISC BRAKE PISTONS FOR ALMOST THREE YEARS. ALUMINUM CASTINGS APPEAR PROMINENTLY IN THE STEERING SYSTEMS OF FORD PRODUCTS FOR 1978, PARTICULARLY ON THE NEW FAIRMONT AND ZEPHYR. A NEW POWER STEERING PUMP IS ALSO USED ACROSS THE BOARD ON FORD PRODUCTS FOR 1978. THE NEW PUMP IS A TWO-PIECE UNIT, COMBINING A DIE-CAST ALUMINUM HOUSING WITH A PLASTIC RESERVOIR. FIBER GLASS FILLED NYLON IS BEING USED ON A NEW ONE-PIECE STEERING COLUMN HOUSING BY GENERAL MOTORS (GM). GM EXPECTS TO PRODUCE MORE THAN TWO MILLION OF THE HOUSINGS FOR THE 1978 MODEL YEAR, ACROSS SEVERAL CAR LINES. HIGH-STRENGTH, LOW-ALLOY (HSLA) STEELS ARE PROVING USEFUL IN SUSPENSION COMPONENTS. THE FORD FAIRMONT AND ZEPHYR UTILIZE HSLA STEEL IN BOTH THE UPPER AND LOWER SUSPENSION ARMS, AND FRONT SHOCK ABSORBER MOUNTINGS. A NEW MATERIAL, GRAPHITE FIBER WHICH IS ENCASED IN EPOXY RESIN, IS BEING TESTED FOR LEAF SPRING APPLICATIONS. WEIGHT SAVING REPLACEMENTS FOR THE STAMPED STEEL WHEEL ARE BEING DEVELOPED WITH THE REINFORCED PLASTIC WHEEL GAINING MORE CREDIBILITY LATELY. THE USE OF CAST OR FORGED ALUMINUM FOR STYLED WHEELS HAS BEEN TOO EXPENSIVE FOR WIDE USAGE AS STANDARD EQUIPMENT, BUT THIS SITUATION COULD CHANGE WITH THE DEVELOPMENT OF A FABRICATED ALUMINUM WHEEL. TENTATIVE PLANS BY KELSEY-HAYES CALL FOR THE INTRODUCTION OF ITS FABRICATED ALUMINUM WHEEL IN 1979 CARS. ANOTHER OPTION FOR WHEEL CONSTRUCTION IS FOUND IN THE DODGE MONACO AND MAGNUM XE MODELS FOR 1978 WHERE AN ALUMINUM FASCIA WHEEL IS USED. THIS STYLED ITEM CONSISTS OF A CAST ALUMINUM RADIAL FIN

ASSEMBLY PERMANENTLY ATTACHED TO A STEEL BASE WHEEL.

by RICHARD J. FOSDICK
Publ: AUTOMOTIVE INDUSTRIES V157 N9 P99-103 (1 DEC 1977)
1977
SEE ALSO HS-022 406--HS-022 408.
Availability: SEE PUBLICATION

HS-022 410

AUTOMOBILE EMISSION CONTROL. TECHNOLOGICAL APPROACHES TOWARD IMPROVING IN-USE VEHICLE EMISSIONS PERFORMANCE. FINAL REPORT

ENVIRONMENTAL PROTECTION AGENCY, EMISSION CONTROL TECHNOLOGY DIV., 2565 PLYMOUTH RD., ANN ARBOR, MICH. 48105
Rept. No. PB-267 537 12 USING CURRENTLY AVAILABLE DATA SOURCES, THE POSSIBLE CAUSE(S) OF EMISSION PERFORMANCE PROBLEMS OF IN-USE VEHICLES BEING USED BY THE ENVIRONMENTAL PROTECTION AGENCY (EPA) IN ITS EMISSION FACTORS PROGRAM (EFP) WAS STUDIED AND POTENTIAL TECHNICAL APPROACHES TOWARD IMPROVING THE PERFORMANCE EVALUATED. WHILE THE EFP WHICH WAS INITIATED IN 1971 WAS DESIGNED TO PROVIDE INPUT OF EXHAUST EMISSION LEVELS FOR AIR QUALITY MODELING, THE PROGRAM HAS INDICATED THAT A PROBLEM EXISTS WITH IN-USE VEHICLE EMISSIONS PERFORMANCE WHEN THESE VEHICLES ARE TESTED IN THE AS-RECEIVED STATE OF TUNE-UP AND MAINTENANCE CONDITION. EMISSION LEVELS OF THESE VEHICLES HAVE BEEN IN EXCESS OF FEDERAL EMISSION STANDARDS. DATA FROM THE 1975 EFP HAVE INDICATED THAT A SUBSTANTIAL NUMBER OF 1975 MODEL YEAR LOW-MILEAGE VEHICLES WERE FAILING TO MEET THE 1975 STANDARDS OF 1.5 HC (HYDROCARBON), 15 CO (CARBON MONOXIDE), 3.1 NOX (NITROGEN OXIDES) FOR ONE OR MORE POLLUTANTS. OTHER EPA SURVEILLANCE PROGRAMS HAVE SHOWN THAT IN-USE VEHICLES WHEN PROPERLY MAINTAINED AND TUNED TO MANUFACTURER'S SPECIFICATIONS ARE IN SUBSTANTIAL COMPLIANCE WITH THE FEDERAL EMISSION STANDARDS WHICH THEY WERE DESIGNED TO MEET. THE PRIMARY SOURCES OF DATA USED ARE REPORTS OF EPA-SPONSORED WORK THAT INVOLVED TESTING OF IN-USE AUTOMOBILES. THE TECHNOLOGICAL APPROACHES TO IMPROVING IN-USE PERFORMANCE OF VEHICLES ARE DIVIDED INTO THOSE THAT INVOLVE CHANGES IN AREAS OTHER THAN THE VEHICLE, AND THOSE INVOLVING CHANGES TO THE VEHICLE. THERE EXISTS A RELATIONSHIP BETWEEN IDLE CO LEVELS AND THE ABILITY OF THE VEHICLE TO PASS EITHER THE 1975 FEDERAL TEST PROCEDURE (FTP) OR VARIOUS STATE INSPECTION TESTS. MALADJUSTMENT OF THE CARBURETOR IDLE CIRCUIT, WHICH RESULTS IN HIGH IDLE CO LEVELS, NEEDS TO BE PREVENTED. THERE EXISTS A PROBABILITY, POSSIBLY AS HIGH AS 37%, THAT A VEHICLE WITH LOW (LESS THAN 0.5% IDLE CO) COULD ALSO FAIL THE FTP. THERE IS NO GENERAL AGREEMENT ON THE CAUSE(S) OF POOR IN-USE VEHICLE EMISSIONS PERFORMANCE, AND MORE INFORMATION IS NEEDED TO MORE PROPERLY ASSESS THE IN-USE PROBLEM BEFORE AN ATTEMPT CAN BE MADE TO DEMONSTRATE SOLUTIONS. THE FOLLOWING RECOMMENDATIONS ARE PROPOSED: CARBURETOR IDLE CIRCUIT, NO ADJUSTMENT OF IDLE DURING CERTIFICATION DURABILITY TESTING INCLUSION OF A DRIVEABILITY TEST IN THE CERTIFICATION PROCEDURE, STUDY OF THE POSSIBILITY OF INTRODUCING FEDERALLY MANDATED DRIVEABILITY STANDARDS, STUDY OF THE SERVICE INDUSTRY/OWNER INTERFACING, STUDY THE USE OF EPA MECHANICS TO FACTOR SOME APPROXIMATION OF IN-USE MAINTENANCE INTO THE CERTIFICATION PROCEDURE, AND STANDARDIZATION OF TUNE-UP ADJUSTMENT METHODS. ; 1976; 45P 7REFS
Availability: NTIS

HS-022 411

EFFECTIVENESS OF VEHICLE SAFETY INSPECTIONS NEITHER PROVEN NOR UNPROVEN REPORT TO THE CONGRESS BY THE COMPTROLLER GENERAL OF THE UNITED STATES

THE NATIONAL HWY. TRAFFIC SAFETY ADMINISTRATION'S (NHTSA) PERIODIC MOTOR VEHICLE INSPECTION (PMVI) PROGRAM STANDARD ISSUED IN JUN 1967 IS DISCUSSED WITH RESPECT TO STATE COMPLIANCE. AFTER NHTSA ISSUED THE STANDARD, 10 STATES ADOPTED THE PROGRAM BY JAN 1969, JOINING 21 OTHERS AND THE DISTRICT OF COLUMBIA THAT ALREADY HAD PMVI PROGRAMS. NHTSA THEN REACHED AN IMPASSE WITH THE REMAINING STATES. RESISTANCE HAS BEEN EVEN GREATER TO THE VEHICLE IN-USE (VIU) STANDARDS ISSUED IN SEP 1973, EVEN BY THOSE STATES COMPLYING WITH THE PMVI STANDARD. ACCORDING TO DEPT. OF TRANSPORTATION (DOT) OFFICIALS, ONLY THREE STATES FULLY MET THE STANDARD AS OF JUL 1977. IN A JUL 1977 REPORT TO THE CONGRESS, DOT RECOMMENDED THAT MANDATORY COMPLIANCE WITH THE 18 FEDERAL HIGHWAY SAFETY STANDARDS IS NO LONGER APPROPRIATE BECAUSE STATE SAFETY AGENCIES HAVE DEVELOPED TO THE DEGREE WHERE THEY ARE ABLE TO IDENTIFY AND ADDRESS CRITICAL SAFETY PROBLEMS. BECAUSE VEHICLE DEFECTS CAN AND DO CAUSE HIGHWAY ACCIDENTS, POSSIBLY AS MANY AS 15% TO 25%, AND BECAUSE SOME TYPES OF DEFECTS, SUCH AS MASSIVE FAILURE OF BRAKES, COULD LEAD TO SERIOUS ACCIDENTS, THE GENERAL ACCOUNTING OFFICE (GAO) MAKES THE FOLLOWING RECOMMENDATIONS TO THE CONGRESS: REJECT DOT'S RECOMMENDATION WHICH WOULD MAKE COMPLIANCE WITH THE FEDERAL VEHICLE SAFETY INSPECTION STANDARDS OPTIONAL, REQUIRE DOT TO MODIFY THE FEDERAL INSPECTION STANDARDS TO ALLOW STATES FLEXIBILITY IN DETERMINING THE SPECIFIC TYPE OF INSPECTION PROGRAM BEST SUITED TO THEIR HIGHWAY NEEDS, AND DIRECT DOT TO UNDERTAKE PRIORITY RESEARCH INTO THE EFFECTIVENESS OF PERIODIC INSPECTION STANDARDS FOR DETECTING AND CORRECTING VEHICLE DEFECTS BEFORE THEY LEAD TO ACCIDENTS AND COORDINATE THE

RESEARCH WITH STATES TO HELP ENSURE ACCEPTABILITY OF THE RESULTS.

GENERAL ACCOUNTING OFFICE, COMPTROLLER GENERAL OF THE UNITED STATES, WASHINGTON, D.C. 20548
Rept. No. CED-78-18; 1977; 37P
Availability: GAO $1.00 OR FREE OF CHARGE IF ENTITLED

HS-022 412

ANALYSIS OF FATAL TRAFFIC CRASHES IN CANADA, 1976 FOCUS: THE IMPAIRED DRIVER

STATISTICAL INFORMATION ON ALCOHOL CONSUMPTION AMONG FATALLY INJURED DRIVERS AND PEDESTRIANS IN SEVEN OF THE CANADIAN PROVINCES (BRITISH COLUMBIA, ALBERTA, SASKATCHEWAN, MANITOBA, ONTARIO, NEW BRUNSWICK, PRINCE EDWARD ISLAND) DURING 1976 IS PRESENTED. DATA FROM 1974 AND 1975 ARE ALSO PROVIDED FOR COMPARATIVE PURPOSES. FOR PURPOSES OF COMPARISON AND CONSISTENCY, DRINKING DRIVERS (OR PEDESTRIANS) HAVE BEEN DEFINED AS THOSE WITH POSITIVE BAC'S (GREATER THAN 10 MG% W/V), AND IMPAIRED VICTIMS ARE THOSE WITH BAC'S OVER 80 MG% (THE CURRENT CANADIAN LEGAL LIMIT). IN CALCULATING THE PROPORTION OR PERCENTAGE OF THOSE WHO HAD BEEN DRINKING, OR WERE IMPAIRED, ONE CRUCIAL ASSUMPTION WAS MADE, NAMELY, THAT THOSE VICTIMS WHO WERE NOT TESTED FOR BLOOD ALCOHOL HAD ZERO BLOOD ALCOHOL. THUS, ESTIMATIONS OF IMPAIRMENT WERE CALCULATED AS FOLLOWS: NUMBER OF PERSONS (E.G. DRIVERS) TESTED FOR BLOOD ALCOHOL AND FOUND TO HAVE BAC LEVELS IN EXCESS OF 80 MG%, EXPRESSED AS A PORTION OR PERCENTAGE OF ALL FATALLY INJURED DRIVERS. IN SUMMARY, DATA ON FATALLY INJURED DRIVERS BY VEHICLE TYPE FOR ALL SEVEN PROVINCES REVEAL THE FOLLOWING INFORMATION ON ALCOHOL CONSUMPTION/IMPAIRMENT: CAR DRIVERS, AT LEAST 47% HAD BEEN DRINKING (HBD) AND AT LEAST 38% IMPAIRED; TRUCK AND VAN DRIVERS, AT LEAST 49% HBD, AT LEAST 42% WERE IMPAIRED; MOTORCYCLE OPERATORS, AT LEAST 40% HBD, AT LEAST 29% IMPAIRED; TRACTOR-TRAILER OPERATORS, AT LEAST 25% HBD, AT LEAST 25% IMPAIRED; AND SNOWMOBILE OPERATORS, AT LEAST 60% HBD, AT LEAST 52% IMPAIRED. WITH REGARD TO THE DRINKING DRIVER PROBLEM, THE FOLLOWING RECOMMENDATIONS ARE MADE: REASSESS AND CRITICALLY EVALUATE EXISTING IMPAIRED-DRIVING COUNTERMEASURE PROGRAMS, CONSIDER FURTHER RESEARCH OF THE ABUSE OF ALCOHOL IN THE WORKPLACE (ESPECIALLY WITH RESPECT TO PROFESSIONAL DRIVERS), INITIATE AN IN-DEPTH INVESTIGATION OF THE IMPACT OF MOTORCYCLE TRAINING COURSES ON THE COLLISION BEHAVIOR OF MOTORCYCLE DRIVERS, CONDUCT RESEARCH TO DETERMINE THE EXTENT TO WHICH LOW BAC LEVELS INFLATE DISPROPORTIONATELY THE RISK OF COLLISION FOR MOTORCYCLE DRIVERS, AND PROVIDE CONSIDERABLY MORE PUBLIC INFORMATION/EDUCATION PROGRAMS IN THE AREA OF ALCOHOL INVOLVEMENT IN SNOWMOBILE FATALITIES. WITH REGARD TO PEDESTRIANS, THE FOLLOWING RESULTS WERE FOUND: APPROXIMATELY ONE FOURTH OF TOTAL PEDESTRIAN FATALITIES UNDER 14 YEARS OF AGE; APPROXIMATELY ONE FOURTH OF TOTAL 65 YEARS OF AGE AND OVER; ALCOHOL CONSUMPTION VERY INFREQUENT AMONG THE PRECEDING TWO GROUPS; AMONG THE REMAINING 52% OF PEDESTRIAN FATALITIES, 43% HAVING CONSUMED ALCOHOL (HIGHEST IN AGE RANGE 18-19 WITH 68% HAVING POSITIVE BAC'S AND 53% HAVING IN EXCESS OF 80 MG%). BAC'S OF PEDESTRIAN FATALITIES WERE GENERALLY HIGHER THAN THOSE OF DRIVERS; 72% OF PEDESTRIANS HAD BAC'S IN EXCESS OF 150 MG% (57% IN EXCESS OF 200 MG% AND 15% IN EXCESS OF 300 MG%).

by H. M. SIMPSON; R. A. WARREN; L. PAGE-VALIN; D. COLLARD
TRAFFIC INJURY RES. FOUNDATION OF CANADA, 1765 ST. LAURENT BLVD., OTTAWA, ONT. K1G 3V4, CANADA
1978; 38P
FUNDED IN PART BY NON-MEDICAL USE OF DRUGS DIRECTORATE, HEALTH AND WELFARE CANADA AND THE MOTOR VEHICLE MANUFACTURERS ASSOC.
Availability: CORPORATE AUTHOR $3.00

HS-022 413

PROTECTIVE HELMETS FOR MOTORCYCLE AND MOPED RIDERS. ENDORSED FRENCH STANDARD. NF (FRENCH STANDARD) S 72-302 (CASQUES DE PROTECTION POUR USAGERS DE MOTOCYCLES ET DE CYCLOMOTEURS. NORME FRANCAISE HOMOLOGUEE NF S 72-302)

THE FRENCH STANDARD FOR PROTECTIVE HELMETS FOR MOTORCYCLE AND MOPED DRIVERS, NF S 72-302, IS PRESENTED. THE CRITERIA ADOPTED IN THIS STANDARD REFLECT THE CURRENT STATE OF THE ART OF STUDIES IN THIS AREA. THESE CRITERIA ARE BASED ON RESULTS OF LABORATORY TESTS AND EXPERIENCE ACQUIRED IN STUDYING ACTUAL ACCIDENTS. THE GENERAL CHARACTERISTICS, DIMENSIONAL CHARACTERISTICS, PHYSICAL CHARACTERISTICS, MECHANICAL CHARACTERISTICS, CONSPICUITY REQUIREMENTS, AND ANTI-THEFT DEVICES OF THE PROTECTIVE HEADGEAR ARE DETAILED SEPARATELY; AND THE TEST PROCEDURES USED TO VERIFY THAT HELMETS MEET THE SPECIFICATIONS ARE DESCRIBED.

1977; 44P
TEXT ALSO IN FRENCH.
Availability: TECHTRAN CORP., P.O. BOX 729, GLEN BURNIE, MD.

HS-022 414

WORLD MOTOR VEHICLE DATA. 1974 ED.

A STATISTICAL COMPILATION OF INTERNATIONAL MOTOR VEHICLE DATA THROUGH 1973 IS PRESENTED. THE FIRST SECTION OF THE REPORT PROVIDES TABULATED DATA ON 1972/1973 WORLD

CLE ASSEMBLIES AND 1973 WORLD VEHICLE REGISTRATIONS, AND HISTORICAL WORLD VEHICLE DATA (PRODUCTION 1900-1973, EXPORTS 1926-1973, NEW REGISTRATIONS 1928-1973, AND TOTAL REGISTRATIONS 1928-1973). THIS IS FOLLOWED BY INDIVIDUAL SECTIONS FOR GEOGRAPHICAL AREAS (AFRICA, ASIA, EUROPE, EASTERN EUROPE, OCEANIA, AND WESTERN HEMISPHERE) WHICH ARE SUBDIVIDED BY COUNTRY AND/OR REGION AND CONTAIN TABULATED DATA ON EXPORTS, IMPORTS, REGISTRATIONS, FORECASTS, MANUFACTURERS, AND PRODUCTION. A TABLE IS PROVIDED SHOWING PERCENTAGES OF HOUSEHOLDS OWNING CARS IN SELECTED COUNTRIES FOR 1955, 1960, 1965, AND 1970. A FINAL SECTION PRESENTS DISCUSSIONS OF LONG-RANGE FORECASTS FOR VEHICLE POPULATIONS, PRODUCTION, LEVELS OF CAR OWNERSHIP, EXPORTS, ETC. FOR SOME COUNTRIES, AS EXCERPTED FROM VARIOUS PUBLISHED SOURCES.

by JACQUES J. EVERS
MOTOR VEHICLE MANUFACTURERS ASSOC. OF THE UNITED STATES, INC., 320 NEW CENTER BLDG., DETROIT, MICH. 48202
1974; 181P REFS
Availability: CORPORATE AUTHOR

HS-022 415

WORLD MOTOR VEHICLE DATA. 1973 ED.

A STATISTICAL COMPILATION OF INTERNATIONAL MOTOR VEHICLE DATA THROUGH 1972 IS PRESENTED. THE FIRST SECTION OF THE REPORT PROVIDES TABULATED DATA ON 1971/1972 WORLD MOTOR VEHICLE PRODUCTION, 1972 WORLD VEHICLE ASSEMBLIES AND 1971 WORLD VEHICLE REGISTRATIONS, AND HISTORICAL WORLD VEHICLE DATA (PRODUCTION 1900-1972, EXPORTS 1926-1972, NEW REGISTRATIONS 1928-1972, AND TOTAL REGISTRATIONS 1928-1972). THIS IS FOLLOWED BY INDIVIDUAL SECTIONS FOR GEOGRAPHICAL AREAS (AFRICA, ASIA, EUROPE, EASTERN EUROPE, OCEANIA, AND WESTERN HEMISPHERE) WHICH ARE SUBDIVIDED BY COUNTRY AND/OR REGION AND CONTAIN TABULATED DATA ON EXPORTS, IMPORTS, REGISTRATIONS, AND PRODUCTION.

by JACQUES J. EVERS
MOTOR VEHICLE MANUFACTURERS ASSOC. OF THE UNITED STATES, INC., 320 NEW CENTER BLDG., DETROIT, MICH. 48202
1973; 136P REFS
Availability: CORPORATE AUTHOR

HS-022 416

THE DESIGN AND PERFORMANCE OF AN IN-CAR MISFIRE WARNING LIGHT SYSTEM

AN IN-CAR WARNING SYSTEM HAS BEEN DESIGNED WHICH INDICATES THE OCCURRENCE OF EXCESSIVE ENGINE MISFIRES BY ANALYZING THE IONIZATION SIGNALS OBTAINED FROM EACH SPARK PLUG'S CENTER ELECTRODE. A PROTOTYPE MODEL OF THIS DESIGN HAS BEEN BUILT AND EVALUATED ON A 2000 CC, 1973 PRODUCTION FOUR-CYLINDER ENIDLE TO 6000 RPM. THE SYSTEM CONSISTS OF TWO BASIC ELEMENTS, ADAPTERS FOR EACH CYLINDER THAT FIT INTO THE DISTRIBUTOR CAP FOR OBTAINING THE COMBUSTION SIGNALS, AND A SIMPLE ELECTRONIC CIRCUIT FOR ANALYZING THESE SIGNALS AND ACTIVATING A WARNING LIGHT. SINCE THE ADAPTERS CONSIST ONLY OF A 20 M-OHM ISOLATION RESISTOR AND A CONNECTOR, THEY COULD EASILY BE DESIGNED AS AN INTEGRAL PART OF THE DISTRIBUTOR CAP. SINCE THE INSTRUMENT WILL DETECT EXCESSIVE MISFIRING CONDITIONS, INCLUDING THOSE CAUSED BY BROKEN OR SHORTED SPARK PLUG WIRES, AND HAS THE SELF-CHECKING FEATURE OF TURNING ON THE INDICATOR LAMP FOR A SHORT PERIOD OF TIME WHEN THE IGNITION SWITCH IS ENGAGED, IT SHOULD BE USEFUL AS A WARNING SYSTEM TO INFORM THE DRIVER THAT THE ENGINE IS IN NEED OF REPAIR. THE PRESENT DESIGN IS INTENDED FOR FOUR-CYLINDER OPERATION ONLY, BUT THE CIRCUIT CONCEPT IS READILY EXPANDABLE FOR EIGHT-CYLINDER OPERATION.

by WAYNE J. JOHNSON; WILLIAM G. RADO
TRANSACTIONS ON VEHICULAR TECHNOLOGY VVT-27 N1 P18-23 (FEB 1978)
1978; 3REFS
Availability: SEE PUBLICATION

HS-022 417

A STUDENT-DESIGNED AUTOMOTIVE COLLISION AVOIDANCE SYSTEM

A STUDENT-DESIGNED AUTOMOTIVE COLLISION AVOIDANCE SYSTEM IS A RECEIVER-TRANSMITTER SYSTEM AT 99 MHZ, ENERGIZED BY A SHOCK-ACTIVATED SWITCH TO PROVIDE WARNINGS OF COLLISION, EMERGENCY VEHICLES, OR OTHER ROAD HAZARDS. THE SYSTEM, DESIGNED AND CONSTRUCTED AS PART OF A SENIOR DESIGN SEQUENCE (TEXAS A AND M UNIV.), WAS INTENDED TO BE SIMPLE AND RELIABLE, AND, WHEN TRANSLATED INTO MODERN INTEGRATED CIRCUIT TECHNOLOGY, IT CAN BE INSTALLED AT A LOW COST PER VEHICLE. IT PROVIDES ADVANTAGES OVER RADAR BRAKING IN THAT IT IS PRACTICALLY FEASIBLE AND MUCH LESS EXPENSIVE. IT HAS ADVANTAGES OVER OTHER APPROACHES IN THAT IT CAN BE USED IN THE DAYTIME OR AT NIGHT AND IN ANY WEATHER. THE PRESENT SYSTEM IS, AT BEST, A FIRST-CUT PROTOTYPE. A NUMBER OF TASKS NEED TO BE PERFORMED BEFORE A COMPLETE, POLISHED, AND PRESENTABLE SYSTEM CAN BE SAID TO EXIST. THESE TASKS INCLUDE COST, SIZE, AND WEIGHT MINIMIZATIONS THROUGH THE USE OF THE LATEST INTEGRATED CIRCUITRY. CODING AND MODULATION SHOULD BE INTRODUCED TO DISTINGUISH BETWEEN TYPES OF HAZARDS AND TO MINIMIZE PICKUP OF SPURIOUS SIGNALS. RANGE REQUIREMENTS SHOULD BE MORE THOROUGHLY EXAMINED TO DETERMINE PROPER POWER AND FREQUENCY TO ALLOW SAFE STOPPING. ANTENNA DESIGNS SHOULD BE CONSIDERED FOR CONCEALMENT ON AUTOS, FOR SAKE OF APPEARANCE, AND FOR DIRECTIONAL AND

OTHER CHARACTERISTICS FOR RAILROAD TRAINS. FINALLY, SHOCK, VIBRATION, AND ENVIRONMENTAL TESTING ARE NECESSARY FOR A FINISHED PRODUCT.

by CLOVIS R. HADEN
Publ: TRANSACTIONS ON VEHICULAR TECHNOLOGY VVT-27 N1 P31-4 (FEB 1978)
1978; 10REFS
Availability: SEE PUBLICATION

HS-022 418

TRAFFIC ENGINEERING FOR PEDESTRIAN SAFETY

A TRAFFIC ENGINEERING PROGRAM FOR PEDESTRIAN SAFETY IS DIRECTED AT CITIES BUT IS EQUALLY APPLICABLE TO COUNTIES AND STATES. IT HAS TWO MAJOR ASPECTS FOR PEDESTRIAN SAFETY: ADMINISTRATIVE PROVISIONS AND TRAFFIC ENGINEERING DESIGN PROVISIONS. FIVE PRINCIPAL AREAS IN WHICH REGULATIONS OR PROCEDURES SHOULD BE ESTABLISHED TO PROVIDE THE CITY TRAFFIC ENGINEER OR OTHER RESPONSIBLE OFFICIAL WITH THE NECESSARY AUTHORITY TO ADMINISTER AND ENFORCE AN EFFECTIVE TRAFFIC ENGINEERING PROGRAM FOR PEDESTRIAN SAFETY ARE AS FOLLOWS: SUBDIVISION REGULATIONS, PARKING LOT DESIGN REGULATIONS, SIDEWALK PLACEMENT AND DESIGN REGULATIONS, ON-STREET PARKING CONTROL AT PEDESTRIAN CROSSINGS, AND PERIODIC REVIEW OF PEDESTRIAN GENERATORS AND ATTRACTORS. THREE AREAS OF TRAFFIC ENGINEERING DESIGN PROVISIONS FOR PEDESTRIAN SAFETY ARE AS FOLLOWS: GEOMETRIC CONSIDERATIONS (E.G. WIDTH OF STREETS), SIGNING AND PAVEMENT MARKING CONSIDERATIONS, AND SIGNALIZATION CONSIDERATIONS.

by FRED L. ORCUTT, JR.; HOLLINS A. WALKER, JR.
Publ: TRANSPORTATION ENGINEERING V48 N1 P16-22 (JAN 1978)
1978; 45REFS
Availability: SEE PUBLICATION

HS-022 419

GUIDELINES FOR PROHIBITING RIGHT TURN ON RED AT SIGNALIZED INTERSECTIONS

A RECOMMENDED SET OF GUIDELINES FOR PROHIBITING RIGHT TURN ON RED (RTOR) AT SIGNALIZED INTERSECTIONS IS BASED ON THE RESULTS OF INTERSECTION OPERATIONS AND SAFETY STUDIES CONDUCTED AT SEVERAL LOCATIONS FOR THE FEDERAL HWY. ADMINISTRATION. THE FOLLOWING 19 FACTORS WERE CONSIDERED IN PROHIBITING RTOR UNDER THE GENERALLY PERMISSIVE RULE (RTOR ALLOWED AT ALL INTERSECTIONS UNLESS OTHERWISE SIGNED) AND ARE DISCUSSED EITHER SEPARATELY OR COLLECTIVELY: FIVE OR MORE APPROACHES, RESTRICTIVE GEOMETRICS, INADEQUATE SIGHT DISTANCE, SIGNIFICANT PEDESTRIAN VOLUMES, HIGH SPEEDS THROUGH INTERSECTION, EXCLUSIVE PEDESTRIAN PHASE (ALL-RED), RTOR CONFLICTS WITH OTHER VEHICLE MOVEMENTS (E.G. LEFT TURN PHASE), SIGNALS UNDER SCHOOL CROSSING WARRANT, VEHICLE CONFLICT SERIOUS, RIGHT TURN PERMITTED FROM TWO OR MORE LANES, HISTORY OF ACCIDENTS RELATED TO RTOR (FIVE OR MORE), COMPLEX SIGNAL PHASING, SIGNED SCHOOL CROSSING, NO APPRECIABLE RIGHT TURNS, SHORT RED INTERVAL, PEDESTRIAN SIGNAL LOCATIONS, FULLY ACTUATED SIGNALS, CAPACITY PROBLEMS FOR ACCEPTANCE LANE, AND RAILROAD CROSSING INTERCONNECTION. IT IS RECOMMENDED THAT RTOR BE PROHIBITED FOR THE FOLLOWING CONDITIONS: WHERE SIGHT DISTANCE OF VEHICLES APPROACHING FROM THE LEFT IS LESS THAN THE FOLLOWING MINIMUMS: CROSS STREET SPEED LIMITS (MPH) AND CORRESPONDING MINIMUM SIGHT DISTANCE (FEET), 20 AND 120, 25 AND 150, 30 AND 190, 35 AND 220, 40 AND 270, 45 AND 320, 50 AND 360, AND 55 AND 410; WHERE THE INTERSECTION HAS MORE THAN FOUR APPROACHES OR HAS RESTRICTED GEOMETRICS WHICH CAUSE ADDITIONAL CONFLICTS (ONLY APPLICABLE TO APPROACHES WHICH HAVE MULTIPLE OR UNUSUAL CONFLICTS THAT ARE NOT EASILY IDENTIFIED BY THE MOTORIST); WHERE THERE IS AN EXCLUSIVE PEDESTRIAN SIGNAL PHASE DURING WHICH PEDESTRIANS CAN USE ALL CROSSWALKS; AND WHERE THE INTERSECTION IS WITHIN 200 FEET OF A RAILROAD GRADE CROSSING, AND THE SIGNAL CONTROLLER IS PREEMPTED DURING TRAIN CROSSINGS (APPLICABLE ONLY TO THE APPROACH FROM WHICH RIGHT TURNS ARE MADE INTO THE LANE CROSSING THE RAILROAD). ALSO, IT IS RECOMMENDED THAT RTOR MAY BE PROHIBITED FOR THE FOLLOWING CONDITIONS: WHERE SIGNIFICANT PEDESTRIAN CONFLICTS ARE RESULTING FROM RTOR MANEUVERS; WHERE MORE THAN ONE RTOR ACCIDENT PER YEAR HAS BEEN IDENTIFIED FOR ANY PARTICULAR APPROACH; WHERE THERE IS AN UNUSUAL MOVEMENT, SUCH AS DOUBLE-LEFT TURNS, THAT WOULD NOT BE ANTICIPATED BY THE RTOR DRIVER; AND WHERE THERE ARE SCHOOL CROSSINGS OR LARGE NUMBERS OF CHILDREN OR ELDERLY EXPECTED.

by HUGH W. MCGEE
Publ: TRANSPORTATION ENGINEERING V48 N1 P27-31 (JAN 1978)
1978; 4REFS
Availability: SEE PUBLICATION

HS-022 420

THE LEGIBILITY OF SYMBOLIC PARKING SIGNS

THE LEGIBILITY OF SYMBOLIC PARKING SIGNS PROPOSED BY THE TEXAS STATE HWY. DEPT. FOR USE IN DALLAS WAS TESTED USING 34 MEMBERS OF THE TRAFFIC SYSTEMS DIV. OF THE FEDERAL HWY. ADMINISTRATION AS SUBJECTS. ALTHOUGH ECONOMY OF SPACE IS AN IMPORTANT ADVANTAGE OF SYMBOLIC SIGNS OVER THEIR EQUIVALENT WORD MESSAGE SIGNS, VERY /LITTLE STUDY HAS BEEN MADE OF THE DISTANCES AT WHICH HIGHWAY SYMBOLS CAN ACTUALLY BE READ. THE SIGNS TESTED IN THIS STUDY INCLUDED BOTH SYMBOLS AND WORD MESSAGES. THE LEGIBILITY OF THE

DESIGN ELEMENTS WERE DETERMINED AND COMPARED WITH THE LEGIBILITY OF SNELLEN LETTERS. (THE SNELLEN E TEST SHOWS A STANDARD E ARRANGED ON LINES OF DIMINISHING SIZE. THE E FACES RANDOMLY UP, RIGHT, DOWN, AND LEFT ON EACH LINE.) IT WAS FOUND THAT LEGIBILITY DISTANCES OF DIFFERENT ELEMENTS OF THE SIGNS DIFFERED MARKEDLY. ON THE AVERAGE, SYMBOLS WERE IDENTIFIED AT OVER FIVE TIMES THE DISTANCE OF WORD MESSAGES. MESSAGES WITH LARGE LETTERING WERE IDENTIFIED AT ABOUT TWICE THE DISTANCE OF THE MESSAGES WITH SMALL LETTERING ON THE SAME SIGN. THESE DISPARITIES IN LEGIBILITY MAY BE REDUCED BY SHORTENING MESSAGES, EMPLOYING CAPITAL LETTERS, AND USING LARGER, MORE UNIFORM PRINT SIZE. SYMBOL THRESHOLD VISUAL ANGLE WAS FOUND TO AVERAGE 10.5 MINUTES, COMPARED TO 4.19 MINUTES FOR LETTER LINES, AND 3.3 MINUTES FOR THE SNELLEN E CHART. AT MAXIMUM SEEING DISTANCE, SYMBOLS WOULD HAVE TO BE MORE THAN TWICE THE SIZE TO BE IDENTIFIED. SYMBOL LEGIBILITY CAN BE CONSIDERABLY INCREASED BY IMPROVING THE SYMBOL DESIGN. THE CONVENTIONAL "PARKING PROHIBITED" SYMBOL WAS FOUND TO BE DIFFICULT TO READ. AN EXPERIMENTAL SYMBOL WITH A LARGE SLASH WHICH EXTENDED BEYOND THE CIRCLE GAVE DOUBLE THE LEGIBILITY DISTANCE OF THE CONVENTIONAL SYMBOL. THE LEGIBILITIES OF THE FOUR SYMBOLS TESTED WERE FOUND TO INTERCORRELATE HIGHLY, BUT SHOWED LOW CORRELATION WITH VISUAL ACUITY AND WORD MESSAGE LEGIBILITIES. ABILITIES OTHER THAN VISUAL ACUITY SEEM TO BE INVOLVED IN IDENTIFYING PARKING SYMBOLS. PREDICTED LEGIBILITY DISTANCES ARE TABULATED FOR SIGNS RANGING FROM 1 TO 4 FEET (0.3 TO 1.2 M) AND ARE GIVEN FOR THE AVERAGE DRIVER AND FOR THE 94TH PERCENTILE (POORLY SIGHTED) DRIVER.

by DONALD A. GORDON; JOSEPH A. BOYLE
Publ: TRANSPORTATION ENGINEERING V48 N1 P32-6 (JAN 1978)
1978; 2REFS
Availability: SEE PUBLICATION

HS-022 421

WISCONSIN ARRESTS DRUNK DRIVERS

NEW LEGISLATION (30 NOV 1977) IN WISCONSIN REGARDING THE DRUNK DRIVER NOW MAKES .10 BLOOD ALCOHOL CONTENT LEVEL PROOF OF INTOXICATION, WITHOUT CORROBORATING EVIDENCE SUCH AS SLURRED SPEECH OR WOBBLY WALKING. REFUSAL TO TAKE A CHEMICAL TEST FOR INTOXICATION IS MADE A SEPARATE OFFENSE. FIRST CONVICTION FOR OWI (OPERATING WHILE INTOXICATED) MEANS A $100-$500 FORFEITURE AND A LICENSE REVOCATION FROM 90 DAYS TO SIX MONTHS. UNDERGOING COUNSELING OR ATTENDING A TRAFFIC SAFETY SCHOOL MAY BE SUBSTITUTED FOR ALL BUT $100 OF THE FORFEITURE, AND FOR REVOCATION, IF THE COURT SO ORDERS. HOWEVER, PENALTIES FOR SUBSEQUENT CONVICPOSSIBLE JAIL TERM FOR A SECOND CONVICTION, AND DEFINITELY A JAIL TERM FOR A THIRD CONVICTION. EFFECTIVE 1 JUL 1978, PRE-ARREST BREATH TESTS MAY BE CONDUCTED BY LAW ENFORCEMENT OFFICERS AT THE SCENE OF APPREHENSION. AT THE SIGNING OF THE NEW LEGISLATION, A COMPREHENSIVE ENFORCEMENT/EDUCATION PROGRAM CALLED CEASE (CONCENTRATED EFFORT ON ALCOHOL AND SPEED ENFORCEMENT) WAS ANNOUNCED. THIS PROGRAM PROVIDES FOR THE FOLLOWING: CONDUCTING CONCENTRATED LAW ENFORCEMENT TEAM EFFORTS ON WEEKENDS AND HOLIDAYS IN AREAS HAVING HIGH ACCIDENT RATES INVOLVING DRINKING DRIVERS, ADDING 25 MORE RADAR UNITS (WITH ANTI-RADAR-DETECTION DEVICES) TO THE STATE PATROL TO EXTEND SPEED LAW ENFORCEMENT, EQUIPPING STATE PATROL SQUAD CARS WITH CB RADIOS WITH SCANNERS, AND ERECTING HIGHWAY SIGNS THROUGHOUT THE STATE (STATING "WISCONSIN ARRESTS DRUNK DRIVERS" AND PICTURING IN A RED CIRCLE WITH SLASH A CAR OBVIOUSLY BEING DRIVEN BY AN INTOXICATED DRIVER). SIGNS DISTRIBUTED IN 1977 WHICH READ "55 MEANS 55" WILL REMAIN IN PLACE IN 1978. STATE EMPLOYEES WHO HAVE NOT TAKEN THE NATIONAL SAFETY COUNCIL'S DEFENSIVE DRIVING COURSE ARE REQUIRED TO COMPLETE IT BEFORE 1 JUL 1978. EARLY IN 1978, FOR A 60-DAY PERIOD, ABOUT 150 OUTDOOR ADVERTISING POSTERS IN SUPPORT OF THE NEW HIGHWAY SAFETY PROGRAM WILL BE DISPLAYED. THE GOVERNOR'S OFFICE OF HWY. SAFETY EARLY IN 1978 WILL BE PROVIDING MORE THAN 4000 EMPLOYERS WITH INFORMATION ON MATERIALS ABOUT THE DRINKING/DRIVING PROBLEM THAT CAN BE OBTAINED FREE ON REQUEST FOR DISTRIBUTION TO THEIR WORKERS. SEMINARS, SPECIAL RADIO AND TELEVISION SPOTS, PUBLIC SERVICE ADS TO BE SENT IN THE MAIL, AND SPECIAL EFFORTS TO REACH THE YOUNG ARE ALL PLANNED IN WISCONSIN'S EFFORT TO COMBAT DRUNK DRIVING.

by DON GEHRMAN
Publ: TRAFFIC SAFETY V78 N1 P18-9, 26 (JAN 1978)
1978
Availability: SEE PUBLICATION

HS-022 422

A LOOK AT MOTORCYCLE ACCIDENTS IN 1976 [STATISTICS]

IN 1976, MOTORCYCLES, MOTOR SCOOTERS, AND MOTORIZED BICYCLES (TO BE REFERRED TO COLLECTIVELY AS MOTORCYCLES SUBSEQUENTLY) MADE UP 3.6% OF THE TOTAL VEHICLE REGISTRATIONS IN THE U.S., CONSTITUTED 1.5% OF THE TOTAL NUMBER OF VEHICLES INVOLVED IN ALL MOTOR VEHICLE ACCIDENTS, AND CONSTITUTED 5.4% OF THE VEHICLES INVOLVED IN FATAL ACCIDENTS (3000 DEATHS OF MOTORCYLE OPERATORS AND PASSENGERS). DEATHS OF MOTORCYCLE RIDERS INCREASED 7% IN 1976 OVER 1975. THE MILEAGE DEATH RATE FOR MOTORCYCLE RIDERS IN 1976 I

A MOTORCYCLIST HAS A GREATER CHANCE OF BEING INJURED OR KILLED IN AN ACCIDENT THAN IF HE/SHE WERE RIDING IN A VEHICLE AFFORDING MORE PROTECTION. INJURIES SUSTAINED BY MOTORCYCLISTS INVOLVED IN ACCIDENTS TEND TO BE MORE SEVERE THAN THOSE TO PEOPLE IN ACCIDENTS INVOLVING OTHER TYPES OF VEHICLES. THE TOTAL NUMBER OF MOTORCYCLISTS INJURED (MINOR AND SEVERE INJURIES) IN 1976 WAS SLIGHTLY MORE THAN 320,000. COLLISION WITH ANOTHER MOTOR VEHICLE IS THE PREDOMINANT TYPE OF MOTORCYCLE ACCIDENT. NONCOLLISION ACCIDENTS ARE NEXT IN IMPORTANCE. MOTORCYCLE ACCIDENTS OCCUR MOST FREQUENTLY BETWEEN 4 P.M. AND 6 P.M., SATURDAY IS THE WORST DAY OF THE WEEK FOR SUCH ACCIDENTS, AND MOST ACCIDENTS OCCUR IN THE SUMMER MONTHS. THE MAJORITY OF MOTORCYCLE ACCIDENTS OCCUR ON DRY ROADS. THE MAJORITY OF MOTORCYCLE OPERATORS INVOLVED IN ACCIDENTS ARE YOUNG, UNDER 25 YEARS OF AGE. MOST MOTORCYCLISTS INVOLVED IN ACCIDENTS HAVE NOT HAD MUCH RIDING EXPERIENCE SINCE CYCLING HAS INCREASED GREATLY IN RECENT YEARS AND THE AVERAGE AGE OF MOTORCYCLISTS IS YOUNG, AND MANY MOTORCYCLE ACCIDENTS INVOLVE PERSONS WHO HAVE BORROWED MOTORCYCLES (IN EXCESS OF 20% OF THE MOTORCYCLES INVOLVED IN ACCIDENTS ARE BORROWED). HEAD, ARM, AND LEG ARE THE PARTS OF A MOTORCYCLIST'S BODY MOST OFTEN INJURED, WITH THE MOST SERIOUS TYPE INJURY OCCURRING TO THE HEAD. THE MOST IMPORTANT PIECE OF PERSONAL EQUIPMENT FOR SAFE RIDING IS THE HELMET. A DEPT. OF TRANSPORTATION STUDY FOR THE YEARS 1967-1970 SHOWS THAT STATES WITH HELMET LAWS HAD A CONSISTENTLY LOWER FATAL ACCIDENT RATE THAN DID STATES WITHOUT A HELMET LAW. MANY SAFETY POINTERS ARE COVERED IN DETAIL IN THE NATIONAL SAFETY COUNCIL'S DDC MOTORCYCLE SUPPLEMENT, A TWO-HOUR COURSE MAKING USE OF LECTURES, DISCUSSIONS, SLIDE PRESENTATIONS, AND OUTSIDE READINGS.

by BARBARA CARRARO
Publ: TRAFFIC SAFETY V78 N1 P8-11, 27-30 (JAN 1978) 1978
Availability: SEE PUBLICATION

HS-022 423

CHARACTERIZATION OF EXHAUST EMISSIONS FROM A DUAL CATALYST EQUIPPED VEHICLE

A TEST PROGRAM WAS INITIATED TO CHARACTERIZE EXHAUST GAS EMISSIONS FROM AN AUTOMOBILE EQUIPPED WITH A DUAL CATALYST SYSTEM. THE DUAL CATALYST SYSTEM WAS DESIGNED BY GOULD, INC. TO REDUCE EMISSIONS OF ENGINE EXHAUST HYDROCARBONS (HC), CARBON MONOXIDE (CO), AND NITROGEN OXIDES (NOX). IT BASICALLY CONSISTS OF TWO CATALYSTS IN SERIES, A NICKEL-COPPER ALLOY REDUCTION CATALYST TO CONTROL NOX EMISSIONS, AND A PLATINUM-PALLADIUM OXIDATION CATALYST TO CONTROL CO AND HC EMISSIONS. THE TEST VEHICLE, AN AMC HORNET, HAVING A 232 CID SIX-CYLINDER ENGINE, WAS TESTED OVER THE FEDERAL TEST PROCEDURE, THE HWY. FUEL ECONOMY TEST, AND THE SULFATE EMISSION TEST. IN ADDITION TO THE REGULATED GASEOUS EMISSIONS, OTHER SUBSTANCES TESTED FOR WERE SULFUR DIOXIDE, SULFURIC ACID, HYDROGEN CYANIDE, NICKEL CARBONYL, CARBONYL SULFIDE, ALDEHYDES AND DETAILED HC EMISSIONS. A BRIEF DISCUSSION OF EACH METHOD USED TO SAMPLE AND ANALYZE THE NONREGULATED POLLUTANT IS INCLUDED. SULFATE EMISSIONS MEASURED OVER THE SULFATE EMISSION TEST WERE FOUND TO BE COMPARABLE TO THOSE MEASURED ON PRODUCTION CATALYST VEHICLES EQUIPPED WITH AIR PUMPS. SUCH VEHICLES REPRESENT THE HIGHEST SULFATE EMITTERS PRESENTLY IN USE. DETAILED HC ANALYSES DEMONSTRATED THAT HC EMISSIONS FROM THE GOULD CAR WERE OF A LOW REACTIVITY RELATIVE TO OTHER VEHICLES TESTED. NICKEL EMISSIONS WERE SIGNIFICANTLY HIGH, ESPECIALLY THOSE MEASURED ON THE FIRST DAY OF TESTING. ALTHOUGH INITIAL TESTS INDICATE THE POSSIBLE PRESENCE OF NICKEL CARBONYL IN THE DUAL CATALYST VEHICLE'S EXHAUST, SOME DEGREE OF ANALYTICAL REFINEMENT COUPLED WITH FURTHER TESTING IS REQUIRED BEFORE ANY DEFINITE CONCLUSIONS CAN BE DRAWN REGARDING THE EMISSION OF THIS COMPOUND.

by PETER A. GABELE; JAMES N. BRADDOCK; FRANK M. BLACK; FRED D. STUMP; ROY D. ZWEIDINGER
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ENVIRONMENTAL SCIENCES RES. LAB., RESEARCH TRIANGLE PARK, N.C. 27711
Rept. No. EPA-600/2-77-068; PB-266 941; 1977; 31P 11REFS
ENVIRONMENTAL PROTECTION TECHNOLOGY SERIES.
Availability: NTIS

HS-022 424

HIGHWAY SAFETY IMPROVEMENTS THROUGH UTILIZATION OF MERGED ACCIDENT AND ROADWAY DATA. VOL. 1

AN INFORMATION SYSTEM MERGES ACCIDENT AND ROADWAY CHARACTERISTICS DATA USED BY THE NORTH CAROLINA DIV. OF HIGHWAYS IN A USABLE FORM. ACCIDENT DATA WERE DERIVED FROM THE MILEPOSTED ACCIDENT TAPE, THE RESEARCH ACCIDENT FILE, AND THE ACCIDENT NARRATIVE FILE. ROADWAY CHARACTERISTICS DATA SOURCES INCLUDED THE FOLLOWING TAPES, FILES, AND INVENTORIES: MILEAGE INVENTORY; LOCATION INVENTORY; STRUCTURES INVENTORY; FEDERAL RAILROAD CROSSING INVENTORY; STRAIGHT LINE DIAGRAMS; SKID RESISTANCE; TRAFFIC SIGNAL; AND PHOTOLOG. THE BACKGROUND STUDY OF AVAILABLE DATA SOURCES, THE DATA SELECTION PROCESS, THE SYSTEM ANALYSIS PROCEDURE, THE OPERATIONAL INFORMATION SYSTEM, THE UPDATE MECHANISM FOR THIS SYSTEM, THE DEVELOPED USER PROGRAMS, AND THE PROPOSED SYSTEM ADDITIONS ARE REVIEWED. THE NON-DESIGN WORK PERFORMED TO IMPLEMENT THE SYSTEM INCLUDED EDITING DATA AND PREPARING COMPUTER PROGRAMS FOR THE INFORMATION SYSTEM. THE

SHIPS BETWEEN ROADWAY CHARACTERISTICS AND ACCIDENT INVOLVEMENT ON EITHER AN INDIVIDUAL SITE OR A STATEWIDE BASIS, AND WILL THEREFORE AID BOTH IN SELECTING HIGHWAY IMPROVEMENTS BASED UPON ACCIDENT INFORMATION AND IN EVALUATING SUCH IMPROVEMENTS. FLOWCHARTS ARE INCLUDED OF THE OPERATIONAL SYSTEM, THE UPDATE SYSTEM, ADDITION OF CROSSING NUMBERS, AND INITIAL PROCESSING.

by RALPH D. JOHNSON, JR.; WILLIAM C. FISCHER; ELIZABETH G. HAMILTON; FORREST M. COUNCIL
UNIVERSITY OF NORTH CAROLINA, HWY. SAFETY RES. CENTER, CHAPEL HILL, N.C.
1977; 47P
VOL. 2 CONTAINS DETAILED SYSTEM DESCRIPTION AND USER DOCUMENTATION.
Availability: CORPORATE AUTHOR

HS-022 425

EVALUATION OF MOVING RADAR

THE ACCURACY AND RANGE OF THE MR7 MOVING RADAR DEVICE USED SINCE EARLY 1974 BY THE NORTH CAROLINA STATE HWY. PATROL WERE EVALUATED FOR A VARIETY OF ROADWAY CONFIGURATIONS AND RADAR MOUNTING POSITIONS. THE MOVING RADAR IS A SPEED-MEASURING DEVICE THAT OPERATES ON THE SAME BASIC PRINCIPLE AS THE MORE CONVENTIONAL STATIONARY RADAR DEVICE WHICH HAS LONG BEEN IN USE BY ENFORCEMENT OFFICIALS. IN ADDITION TO THE STATIONARY MODE, IT HAS THE ABILITY TO CLOCK ONCOMING VEHICLES WHILE THE PATROL VEHICLE IS MOVING (MOVING MODE) AND IT CAN DISPLAY THE SPEED OF THE PATROL VEHICLE AS IT PROGRESSES DOWN THE HIGHWAY (VERIFY MODE). PRESENTLY APPROXIMATELY 450 MOVING RADAR DEVICES ARE IN USE THROUGHOUT NORTH CAROLINA. FINDINGS INCLUDE THAT THE DEVICE IS ACCURATE TO WITHIN PLUS OR MINUS 2 MPH, THAT IT HAS AN AVERAGE OPERATING RANGE OF 750 FEET, THAT, WITHIN THESE LIMITS, IT CAN BE USED WITH THE ANTENNA MOUNTED BOTH INSIDE AND OUTSIDE THE PATROL VEHICLE, THAT IT WILL PROVIDE SPEED MEASUREMENTS ACROSS WIDE MEDIANS, AND THAT IT CAN PERFORM ACCURATELY WHILE GOING THROUGH CURVES. BASED ON THESE FINDINGS, SEVERAL OPERATIONAL PRACTICES ARE RECOMMENDED. FIRST, AN ALLOWANCE OF 2 MPH IN FAVOR OF THE MOTORIST SHOULD BE CONSIDERED IN ENFORCEMENT PRACTICE. SECOND, PATROLMEN SHOULD BE ALLOWED TO MOUNT THEIR RADARS AT AN ANGLE UP TO 10° FROM STRAIGHT AHEAD IN AREAS WHERE THEY ARE PERFORMING ENFORCEMENT DUTIES ACROSS WIDE MEDIANS. THE CURRENT PATROL GUIDELINES REQUIRE THAT THE RADARS NOT BE OPERATED ON ROADS WITH MEDIANS IN EXCESS OF 50 FEET. HOWEVER, WITH THE RADAR ANTENNA POINTED TO THE LEFT AS MUCH AS 10°, AN ACCURATE ASSESSMENT OF ONCOMING VEHICLES' SPEED CAN BE MADE ACROSS MEDIANS UP TO 105 FEET WIDE. THE CURRENT PATROL GUIDELINES DICTATE THAT THE RADAR ONLY BE OPERATED WITH THE ANTENNA OUTSIDE OF THE VEHICLE AND THAT THE RADAR ANTENNAS THEMSELVES ARE NOT WATERTIGHT HOWEVER, THE RADAR COULD BE MOUNTED INSID DURING INCLEMENT WEATHER WITH NO DIFFICUI TY OTHER THAN A REDUCED ABILITY TO OPERAT ACROSS MEDIANS.

by JOHN H. LACEY; ROBERT B. DANIEL; B. J. CAMPBELL
UNIVERSITY OF NORTH CAROLINA, HWY. SAFETY RES. CENTER, CHAPEL HILL, N.C.
1977; 53P 5REFS
Availability: CORPORATE AUTHOR

HS-022 426

EUROPEAN SYMPOSIUM ON TRENDS IN THE REGULATIONS CONCERNING MOTOR VEHICLE DESIGN [AND] SEMINAR ON ROAD ACCIDENT STATISTICS

A SIX-SESSION SYMPOSIUM AND SEMINAR ON A CIDENT STATISTICS INCLUDED PRESENTATION O PAPERS, PANEL DEBATES, GENERAL DISCUSSIO AND CONCLUSION STATEMENTS BY AUTHORS O GENERAL SUBJECTS OF ENERGY, POLLUTION, AN VEHICLE DESIGN. THE FOCUS OF ALL PRESENT TIONS IS ON CURRENT AND FUTURE REGULATION IN PARTICULAR FOR THE EUROPEAN ECONOM COMMUNITY (EEC). DESIGN OF CARS FOR STRU TURAL STRENGTH AND COMPATIBILITY OF VEH CLES IN THE EVENT OF IMPACT CAN MITIGATE TH SERIOUS EFFECTS OF ROAD ACCIDENTS. VEHICL OCCUPANT PROTECTION IN THE EVENT OF COLL SION IS CURRENTLY A RESEARCH PRIORITY AND SEEN AS MORE REALISTIC THAN ATTEMPTING T DECREASE ACCIDENT FREQUENCY. SUITABLE VEH CLE DESIGN BY SUCH MEANS AS ACTIVE SAFETY IMPORTANT IN PREVENTING AUTOMOBILE A CIDENTS IF THE DRIVER-VEHICLE CONTROL LOOP TAKEN INTO ACCOUNT. A REPORT ON POLLUTAN EMISSIONS FROM MOTOR VEHICLES COVERS VEH CLES DRIVEN BY INTERNAL COMBUSTION ENGINE USING LIQUID FUELS. MOTOR VEHICLE TRAFFIC SEEN AS A MAJOR OFFENDER IN URBAN NOI PROBLEMS AND MUST BE CONTROLLED BY STA DARDS AND REGULATIONS. PRELIMINAR GUIDELINES ARE PRESENTED AS A PRELIMINAR TO EEC DIRECTIVES ON CONSERVATIVE USE O ENERGY AND RAW MATERIALS. THE SEMINAR O ROAD ACCIDENT STATISTICS RECOMMEN STATISTICAL SYSTEMS AT THE LOCAL, NATIONA AND INTERNATIONAL LEVELS TO BE USED AS BASIS FOR REGULATIONS, RESEARCH, AN PLANNING.

COMMISSION OF THE EUROPEAN COMMUNITIES, BRUSSELS, BELGIUM
1975; 435P 62REFS
INCLUDES HS-022 427--HS-022 433. PRESENTED AT SYMPOSIUM AND SEMINAR, MANHATTAN CENTER, BRUSSELS, BELGIUM, 9-12 DEC 1975.
Availability: CORPORATE AUTHOR

HS-022 427

STRUCTURAL STRENGTH AND COMPATIBILITY OF VEHICLES IN THE EVENT OF IMPACT

PASSENGER CARS CAN BE DESIGNED IN SUCH A WAY THAT MITIGATES THE SERIOUS EFFECTS OF ROAD ACCIDENTS. VEHICLE DESIGN SHOULD PROTECT AGAINST INTRUSION; ALLOW FOR SAFE DECELERATION OF OCCUPANTS; PREVENT EJECTION FROM THE CAR; PREVENT FIRE; AND ALLOW EASY EGRESS FROM THE VEHICLE AFTER A COLLISION. EFFORTS TOWARD INTERNATIONAL COOPERATION AND UNIFORM STANDARDS BEGAN IN 1958 WITH THE CONCLUSION OF A TREATY UNDER THE AUSPICES OF THE UNITED NATIONS ECONOMIC COMMISSION FOR EUROPE. CARS AND COMPONENTS WHICH CONFORM TO THE APPROVED PRODUCTION MODEL ARE STAMPED WITH AN "E-MARK" OF APPROVAL, ALLOWING INTERNATIONAL TRADE WITHOUT REPEATED TESTING AND APPROVAL. THE EUROPEAN COMMUNITY, THE U.S. AND JAPAN ARE CURRENTLY GRAPPLING WITH VARIOUS LEGISLATIVE ISSUES REGARDING STANDARDIZATION AND SAFETY. VEHICLE REGULATIONS IN EUROPE AND THE U.S. ARE BASICALLY DESIGN STANDARDS AS OPPOSED TO PERFORMANCE STANDARDS BASED ON HUMAN TOLERANCE CRITERIA DETERMINED BY THE USE OF INSTRUMENTED DUMMIES. EUROPEAN AND U.S. REGULATIONS ARE REVIEWED AS THEY RELATE TO DOOR LATCHES AND HINGES; STEERING MECHANISM IMPACT; SIDE STRENGTH; AND OCCUPANT RESTRAINT INSTALLATION. OTHER REGULATIONS HAVE BEEN FORMULATED FOR INTERIOR FITTINGS; EXTERNAL PROJECTIONS; AND STRENGTH OF SEATS AND SEAT ANCHORAGES. RESEARCH AND FUTURE REGULATIONS MUST, TO BE EFFECTIVE, CENTER ON SEVERAL FUNDAMENTAL ISSUES; FIRST, THE ESSENTIAL NEED FOR OCCUPANT RESTRAINTS. AN OPTIMUM BALANCE SHOULD BE ACHIEVED BETWEEN LARGE AND SMALL VEHICLES SO THAT THE LATTER ARE NOT SUBJECTED TO UNREALISTIC REQUIREMENTS. BUMPER HEIGHTS MUST BE STANDARDIZED AT A LOW LEVEL APPROPRIATE TO VEHICLE-PEDESTRIAN AND CAR FRONT-SIDE IMPACTS. EARLY ACTION ON NEW VEHICLE SAFETY STANDARDS SHOULD BE TAKEN IF CARS TO BE PRODUCED IN THE 1980'S ARE TO BE INFLUENCED BY THEM. APPENDICES INCLUDE AN ANALYSIS OF VEHICLE COMPATABILITY ON THE ROAD; AND A REPORT OUTLINING THE ORDER OF PRIORITY AND MAJOR REQUIREMENTS FOR SAFER CARS FOR THE NEAR FUTURE.

by H. TAYLOR
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Publ: HS-022 426, "EUROPEAN SYMPOSIUM ON TRENDS IN THE REGULATIONS CONCERNING MOTOR VEHICLE DESIGN [AND] SEMINAR ON ROAD ACCIDENT STATISTICS," BRUSSELS, 1975 P13-55, 351-4 1975; 6REFS
PRESENTED AT THE SYMPOSIUM AND SEMINAR, MANHATTAN CENTER, BRUSSELS, BELGIUM, 9-12 DEC 1975.
Availability: IN HS-022 426

HS-022 428

MOTOR VEHICLE NOISE

MOTOR VEHICLE TRAFFIC IS A MAJOR OFFENDER IN URBAN NOISE PROBLEMS AND MUST BE CONTROLLED BY STANDARDS AND REGULATIONS. IN 1970 THE COUNCIL OF EUROPEAN COMMUNITIES DRAFTED A DIRECTIVE RELATING TO PERMISSIBLE SOUND LEVEL AND MOTOR VEHICLE EXHAUST SYSTEMS, AND INCLUDING PROVISIONS FOR SOUND MEASUREMENT. COUNTRIES OUTSIDE THE EUROPEAN COMMUNITIES HAVE NOT YET STANDARDIZED THEIR REGULATIONS, AND USE DIFFERING METHODS OF MEASUREMENT. SINCE THE 1970 DIRECTIVE VEHICLE NOISE LEVELS HAVE ABATED IN URBAN AREAS OF EUROPE. MOST VEHICLE DESIGN MODIFICATIONS HAVE FOCUSED ON INTAKE AND EXHAUST SYSTEMS. UP TO A 50% INCREASE IN TOTAL NUMBER OF CARS IS PREDICTED BY 1985, NECESSITATING STRINGENT NOISE REDUCTION TECHNIQUES FOR INDIVIDUAL VEHICLES. PEAK NOISE AND NIGHTTIME NOISE ARE PARTICULAR PROBLEMS. CURRENT RESEARCH EMPHASIZED SOURCES OF VEHICLE NOISE, WITH ENGINE NOISE BEING THE MAJOR OFFENDER. PROPOSED IMPROVEMENTS CENTER ON INTAKE AND EXHAUST NOISE, ENGINE NOISE, AND THE "ENCAPSULATION" METHOD (SOUND INSULATION OF THE ENGINE COMPARTMENT). NUMEROUS STUDIES ARE CURRENTLY BEING CONDUCTED ON DESIGN CHANGES TO MINIMIZE ENGINE BLOCK VIBRATION. TIRE NOISE, ESPECIALLY AS IT RELATES TO ROAD SURFACE, IS AN IMPORTANT ELEMENT OF NOISE CONTROL RESEARCH. ELECTRIC ENGINES ARE FEASIBLE IN URBAN AREAS, AND WOULD GREATLY REDUCE NOISE AND AIR POLLUTION. NEW REQUIREMENTS CAN BEST BE MET BY FORMULATING CONSISTENT POLICIES IN THE MOTOR VEHICLE PRODUCTION INDUSTRY; URBAN PLANNING WHICH ACCOUNTS FOR NOISE PROBLEMS; TIGHTENING OF REGULATIONS; AND PUBLIC EDUCATION.

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Publ: HS-022 426, "EUROPEAN SYMPOSIUM ON TRENDS IN THE REGULATIONS CONCERNING MOTOR VEHICLE DESIGN [AND] SEMINAR ON ROAD ACCIDENT STATISTICS," BRUSSELS, 1975 P56-78, 355-7 1975
PRESENTED AT THE SYMPOSIUM AND SEMINAR, MANHATTAN CENTER, BRUSSELS, BELGIUM, 9-12 DEC 1975.
Availability: IN HS-022 426

HS-022 429

THE PROTECTION OF VEHICLE OCCUPANTS

VEHICLE OCCUPANT PROTECTION IS CURRENTLY A PRIORITY IN RESEARCH AND DEVELOPMENT EFFORTS TO REDUCE SERIOUS AND FATAL CAR ACCIDENTS. OCCUPANT PROTECTION CRITERIA INCLUDE VOLUNTARY TOLERANCE; MINOR INJURY THRESHOLDS; MINOR INJURY ONLY; AND SEVERE BUT REVERSIBLE INJURY. OCCUPANT PROTECTION

LEGISLATION HAS TRADITIONALLY BEEN APPLIED VIA DESIGN RULES AND PERFORMANCE STANDARDS. FEDERAL MOTOR VEHICLE SAFETY STANDARD (FMVSS) 208 IS CURRENTLY THE ULTIMATE IN PERFORMANCE STANDARDS REGULATION. IN THE FUTURE, PERFORMANCE AND DESIGN REGULATIONS WILL REFLECT THE LATEST SCIENTIFIC KNOWLEDGE ONLY IF LARGE LEAD TIMES ARE ALLOWED. COST-EFFECTIVENESS ANALYSES AND COST/BENEFIT EQUATIONS ARE COMMONLY USED AS A BASIS FOR DISCUSSIONS IN THE VEHICLE SAFETY FIELD. A KNOWLEDGE OF THE FREQUENCY AND SEVERITY OF CRASH CONDITIONS ARE ESSENTIAL TO DEVELOP EFFECTIVE OCCUPANT PROTECTION STANDARDS. TOLERANCE LEVELS AND INJURY CRITERIA MUST BE DELINEATED BEFORE STANDARDS ARE FORMULATED; SPECIFICALLY THE HEAD, FACE CONTACTS, NECK, THORAX, ABDOMEN, AND KNEE/FEMUR/PELVIS. MANY COUNTRIES HAVE ENACTED COMPULSORY RESTRAINT LEGISLATION, WHICH MUST BE TAKEN INTO ACCOUNT DURING RESEARCH AND STANDARD-SETTING. SEAT BELTS ARE SEEN AS THE MOST IMPORTANT FACTOR IN PLANNING OCCUPANT PROTECTION FOR THE FUTURE. FUTURE RESTRAINT TECHNOLOGY SHOULD FOCUS ON IMPROVING THE COMFORT AND ACCEPTANCE OF BELTS. OTHER AREAS OF RESEARCH AND DEVELOPMENT SHOULD BE STEERING ASSEMBLY REQUIREMENTS; DOOR LOCKS AND SIDE STRENGTH; AND HEAD RESTRAINTS AND SEATS. ADEQUATE OCCUPANT PROTECTION ALSO DEPENDS ON INSTRUMENT PANELS AND THE INTERIOR; WINDSCREENS; AND FIRE, SUBMERSION, AND OTHER SPECIAL SITUATIONS.

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Publ: HS-022 426, "EUROPEAN SYMPOSIUM ON TRENDS IN THE REGULATIONS CONCERNING MOTOR VEHICLE DESIGN [AND] SEMINAR ON ROAD ACCIDENT STATISTICS," BRUSSELS, 1975 P79-110, 358-60
1975; 27REFS
PRESENTED AT THE SYMPOSIUM AND SEMINAR, MANHATTAN CENTER, BRUSSELS, BELGIUM, 9-12 DEC 1975.
Availability: IN HS-022 426

HS-022 430

PREVENTION OF ACCIDENTS BY MEANS OF SUITABLE VEHICLE DESIGN

SUITABLE VEHICLE DESIGN BY SUCH MEANS AS ACTIVE SAFETY, BRAKES, HANDLING, TIRES, AND FIELD OF VISION IS IMPORTANT IN PREVENTING AUTOMOBILE ACCIDENTS. ACTIVE SAFETY IS DIVIDED INTO FOUR GROUPS: DRIVING, PERCEPTIONAL, AND OPERATING SAFETY AS WELL AS SAFE CONDITIONS. SPECIFIC COMPONENT GROUPS RELATING TO ACTIVE SAFETY WHICH HAVE BEEN LEGISLATED IN EUROPEAN COUNTRIES ARE, MOST IMPORTANTLY, STEERING, BRAKES, REAR-VIEW MIRRORS, AND AUDIBLE WARNING DEVICES. U.S. STANDARDS ARE MORE NUMEROUS FOR TECHNICAL DETAILS THAN EUROPEAN ECONOMIC COMMUNITY (EEC) DIRECTIVES, EXTENDING TO TIRES, FIELD OF VISION, CONTROLS. ANALYSIS OF EUROPEAN ACCIDENT STATISTICS INDICATES THAT FAULTY VEHICLE COMPONENTS ARE RARELY AT FAULT COMPARED WITH DRIVERS OR WEATHER AND ROAD CONDITIONS. CURRENT RESEARCH AND DEVELOPMENT THUS EMPHASIZES THE DRIVER-VEHICLE CONTROL LOOP. VEHICLE BEHAVIOR IS INVESTIGATED IN VARIOUS COMBINATIONS OF DRIVING CONDITIONS AND INTERNAL OR EXTRANEOUS DISTURBANCES, USING MATHEMATICAL MODELS AND COMPUTER SIMULATIONS. PROBABILITY OF FAILURE OF ANY COMPONENT IS BECOMING AN IMPORTANT FACTOR IN SAFETY RESEARCH. FUTURE LEGISLATION SHOULD ACCOUNT FOR DRIVER ERROR AS WELL AS VEHICLE TECHNICAL DEFECTS TO BE EFFECTIVE.

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Publ: HS-022 426, "EUROPEAN SYMPOSIUM ON TRENDS IN THE REGULATIONS CONCERNING MOTOR VEHICLE DESIGN [AND] SEMINAR ON ROAD ACCIDENT STATISTICS," BRUSSELS, 1975 P143-61, 361-2
1975; 4REFS
PRESENTED AT THE SYMPOSIUM AND SEMINAR, MANHATTAN CENTER, BRUSSELS, BELGIUM, 9-12 DEC 1975.
Availability: IN HS-022 426

HS-022 431

THE RATIONAL USE OF ENERGY AND RAW MATERIALS

THE EUROPEAN COMMUNITY COUNTRIES HAVE NOT ADOPTED SPECIFIC LEGISLATIVE MEASURES TO RATIONALIZE THE USE OF ENERGY AS THEY HAVE FOR SAFETY AND POLLUTION. U.S. REGULATIONS ON ENERGY CONSERVATION ARE EMBODIED IN THE ENERGY CONSERVATION AND OIL POLICY ACT OF 1975. EUROPEAN COMMUNITY ACTION PRELIMINARY TO A DIRECTIVE SHOULD CENTER ON HOMOGENOUS POLICY AS REGARDS MOTOR FUEL PRICES, SPEED LIMITS, ROAD TAXES, AND CONSUMPTION RATES RECORDKEEPING. ANALYSIS OF THE PRESENT POSITION OF ENERGY CONSUMPTION IN EUROPE AND CONJECTURES REGARDING DEVELOPMENTS BOTH IN THE MOTOR VEHICLE AND IN CONSUMPTION AND PRODUCTION OF MOTOR FUELS IN THE FUTURE INCLUDES VEHICLE EFFICIENCY, WEIGHT, INSTALLED POWER, AND AERODYNAMIC RESISTANCE. POSSIBLE SOLUTIONS TO CUTTING DOWN ON ENERGY CONSUMPTION INVOLVE FACTORS DEPENDING ON THE USER SUCH AS AVERAGE MILEAGE AND CHOICE OF MOTOR VEHICLE; AND FACTORS DEPENDING ON THE DESIGN, SUCH AS ENGINE EFFICIENCY AND VEHICLE WEIGHT. SYNTHETIC MOTOR FUELS, DERIVABLE FROM SOURCES OTHER THAN CRUDE OIL, (PARTICULARLY HYDROGEN, ALCOHOLS, AND ETHERS) INCLUDE METHANOL, ETHANOL, AND ETHERS. PROBLEMS EXAMINED IN RELATION TO CONSTRUCTION MATERIALS INCLUDE USE OF LIGHTWEIGHT MATERIALS AND ENERGY REQUIRED FOR CONSTRUCTION, WHICH COULD BE CONTROLLED BY INTENSIVE RECYCLING. THOSE FACTORS REQUIRING ACTION FOR REDUCTION IN ENER-

COULD HAVE AN IMMEDIATE EFFECT, WHEREAS THOSE DEPENDING ON VEHICLE DESIGN CAN ONLY YIELD TANGIBLE RESULTS ON A LONGER TERM BASIS.

by F. SEZZI
SNAMPROGETTI S.P.A., PETROLEUM PRODUCTS RES. LAB., SAN DONATO MILANESE, MILAN, ITALY
Publ: HS-022 426, "EUROPEAN SYMPOSIUM ON TRENDS IN THE REGULATIONS CONCERNING MOTOR VEHICLE DESIGN [AND] SEMINAR ON ROAD ACCIDENT STATISTICS," BRUSSELS, 1975 P162-219, 365
1975; 18REFS
PRESENTED AT THE SYMPOSIUM AND SEMINAR, MANHATTAN CENTER, BRUSSELS, BELGIUM, 9-12 DEC 1975.
Availability: IN HS-022 426

HS-022 432

ROAD ACCIDENT STATISTICS AT NATIONAL AND INTERNATIONAL LEVELS: SYSTEMS, FACTORS, COORDINATION

ACCIDENT PREVENTION, PLANNING, AND LEGISLATION SHOULD IDEALLY BE BASED ON AN INTERNATIONAL SYSTEM OF ACCIDENT STATISTICS WHICH COULD COLLECT MORE EXTENSIVE DATA THAN IS POSSIBLE UNDER ANY ONE NATIONAL SYSTEM. STATISTICAL SYSTEMS ARE BROKEN DOWN INTO PRINCIPAL GROUPS OF FACTORS, GENERAL ACCIDENT FACTORS, UNIT FACTORS, AND HUMAN FACTORS. OTHER CATEGORIES INCLUDE PRINCIPAL GROUPS OF DATA-COLLECTING BODIES, POLICE, RESCUE SERVICES, INSURANCE COMPANIES, VEHICLE INSPECTORS, AND HOSPITALS AND DOCTORS. PREPARATION OF STATISTICS IN COMPLEX SITUATIONS SUCH AS TRAFFIC ACCIDENTS USUALLY CANNOT BE DONE WITH A SINGLE STATISTICAL SURVEY. SYSTEMS MAY BE CLASSIFIED ACCORDING TO THE DEMANDS MADE ON THOSE RESPONSIBLE FOR DATA ASSEMBLY, AND ACCORDING TO USERS' AREAS OF RESPONSIBILITY. NINE STATISTICAL SYSTEMS ARE IDENTIFIED: POLICE STATISTICS, STATISTICS ON THE MECHANICAL CONDITION OF THE VEHICLE, AND MEDICAL STATISTICS; AT EACH OF THREE LEVELS: REGIONAL, NATIONAL, AND INTERNATIONAL. METHODS OF COORDINATING FACTORS INCLUDE PARALLEL AND SEQUENTIAL DATA ACQUISITION AT ALL LEVELS. FACTORS WITH INTERNATIONAL SIGNIFICANCE INCLUDE ACCIDENT, UNIT, AND HUMAN FACTORS SUCH AS TIME, VEHICLE TYPE, AND CATEGORY OF ROAD USER. ROAD ACCIDENT STATISTICS WITHIN THE EUROPEAN COMMUNITY USUALLY INCLUDE TECHNICAL DATA ON VEHICLES, MEDICAL DATA, AND POLICE DATA (ACCIDENT, UNIT, AND HUMAN FACTORS). SHORT TERM RESULTS OF AN INTERNATIONAL SYSTEM OF GENERAL ACCIDENT STATISTICS WOULD INCLUDE FIRST, FINDING THE RELATIONSHIP BETWEEN VARIOUS INDIVIDUAL FACTORS INCORPORATED INTO THE SYSTEM. HOMOGENOUS INTERNATIONAL STATISTICAL MATERIAL WOULD AID COUNTRIES IN FORECASTING EFFECTS OF A SUDDEN NATIONAL ACTION AFFECTING ROAD SAFETY. APPENDICES PRESENT DATA ON PRINCIPAL FEATURES OF THE SYSTEM FOR REPORTING ROAD ACCIDENTS IN DENMARK AS OF JAN 1976, AND TRANSMISSION FORMS FOR TRAFFIC ACCIDENT DATA FROM MEMBER COUNTRIES OF THE EUROPEAN COMMUNITY.

by ERIK ANDREASEN
DANMARKS STATISTIK, SEJROGADE 11, 2100 KOBENHAVN-O, DENMARK
Publ: HS-022 426, "EUROPEAN SYMPOSIUM ON TRENDS IN THE REGULATIONS CONCERNING MOTOR VEHICLE DESIGN [AND] SEMINAR ON ROAD ACCIDENT STATISTICS," BRUSSELS, 1975 P226-339, 366-67
1975; 7REFS
PRESENTED AT THE SYMPOSIUM AND SEMINAR, MANHATTAN CENTER, BRUSSELS, BELGIUM, 9-12 DEC 1975.
Availability: IN HS-022 426

HS-022 433

AIR POLLUTION REPORT

A REPORT ON POLLUTANT EMISSIONS FROM MOTOR VEHICLES COVERS MOTOR VEHICLES DRIVEN BY INTERNAL COMBUSTION ENGINES USING LIQUID FUELS. FOUNDATIONS OF A FUTURE POLICY ON EMISSION STANDARDS INCLUDE SUCH PARAMETERS AS PHYSIOCHEMICAL CHANGES IN POLLUTANTS FOLLOWING THEIR DISCHARGE INTO THE ATMOSPHERE; AND EFFECTS ON PEOPLE AND ENVIRONMENT. FUNDAMENTAL AND ASSOCIATED PARAMETERS FOR INTERNAL COMBUSTION ENGINES SUCH AS COMPOSITION, ADDITIVES, AND IMPURITIES HAVE SIGNIFICANT EFFECTS ON EMISSIONS. THE CURRENT SITUATION WITH REGARD TO TESTING TECHNIQUES IN THE EUROPEAN ECONOMIC COMMUNITY (EEC) ARE DISCUSSED IN TERMS OF RESTRICTIONS IMPOSED BY STANDARDS. AN OUTLINE OF THE SITUATION WITH REGARD TO PRINCIPAL TEST TECHNIQUES OTHER THAN THOSE SET OUT IN EEC DIRECTIVES COVERS TECHNIQUES AND RESTRICTIONS IN THE U.S. FOR SUCH TESTS AS GASEOUS EMISSIONS FROM LIGHT VEHICLES AND CONSTANT VOLUME SAMPLING. PARTICULATE EMISSIONS OF LEAD COMPOUNDS ARE TABULATED BY LEAD CONTENT OF FUELS USED IN THE EEC AND ELSEWHERE. TASKS OF THE MOTOR VEHICLE ENGINEER REGARDING DEVELOPMENT AND RESEARCH FOCUS ON SUCH REQUIREMENTS AS PERFORMANCE, OPERATING FLEXIBILITY, FUEL ECONOMY, AND USER SAFETY. PLANNING OF RESTRICTIONS IMPOSED BY STANDARDS FOR MOTOR VEHICLES DRIVEN BY INTERNAL COMBUSTION ENGINES RELATING TO LIGHT MOTOR VEHICLES IS A PROCESS OPEN TO DEBATE, INCLUDING SUCH ISSUES AS DIVISION OF RESPONSIBILITIES WITH A PROGRAM AND DETERMINING PROGRAM ELEMENTS. A LIST OF ABBREVIATIONS USED IN THE REPORT IS INCLUDED.

by E. SIBENALER
ECOLE ROYALE MILITAIRE, LABORATOIRE DE MECANIQUE-TRANSPORT
Publ: HS-022 426, "EUROPEAN SYMPOSIUM ON TRENDS IN THE REGULATIONS CONCERNING MOTOR VEHICLE DESIGN [AND] SEMINAR ON ROAD

ACCIDENT STATISTICS," BRUSSELS, 1975 P363-4, 368-435
1975
PRESENTED AT THE SYMPOSIUM AND SEMINAR, MANHATTAN CENTER, BRUSSELS, BELGIUM, 9-12 DEC 1975.
Availability: IN HS-022 426

HS-022 434

AUTOMOBILE INSURANCE LOSSES; COLLISION COVERAGES; VARIATIONS BY MAKE AND SERIES. 1977 MODELS DURING THEIR FIRST YEAR; 1976 MODELS DURING THEIR FIRST TWO YEARS; 1975 MODELS DURING THEIR FIRST THREE YEARS

VARIATIONS IN BOTH FREQUENCIES AND SIZE OF COLLISION CLAIMS FOR DAMAGE TO 1975, 1976, AND 1977 MODEL YEAR PRIVATE PASSENGER CARS ARE REPORTED. THE REPORT IS BASED ON DATA FOR COLLISION COVERAGES SUPPLIED BY EIGHT INSURERS. COLLISION CLAIM FREQUENCIES WERE LOWEST FOR THE MOST RECENT CALENDAR PERIOD REPORTED, SEP 1976-1977. COLLISION CLAIM FREQUENCIES FOR 1977 MODELS WERE DOWN 5% FROM 1976 MODELS IN THEIR FIRST YEAR. CLAIM FREQUENCIES FOR 1976 MODELS WERE DOWN 3% FROM THEIR FIRST TO THEIR SECOND YEAR. CLAIMS FOR 1975 MODELS WERE DOWN 10% FROM THEIR SECOND TO THEIR THIRD YEAR. AVERAGE LOSS PAYMENTS PER CLAIM CONSISTENTLY INCREASED WITH EACH NEW MODEL YEAR AND WITH VEHICLE AGE. THE PRODUCT OF THE COLLISION CLAIM FREQUENCIES AND THE AVERAGE LOSS PAYMENTS PER CLAIM, THE AVERAGE LOSS PAYMENTS PER INSURED VEHICLE YEAR, INCREASED BY APPROXIMATELY 6% EACH YEAR FOR THE FIRST YEAR RESULTS OF SUCCESSIVE MODEL YEARS. VARIATIONS IN COLLISION LOSS EXPERIENCE AMONG CARS IN EACH MODEL YEAR WERE MUCH MORE PRONOUNCED THAN THOSE AMONG CARS IN DIFFERENT MODEL YEARS. THE SUBCOMPACTS HAD HIGHER COLLISION CLAIM FREQUENCIES AND HIGHER AVERAGE LOSS PAYMENTS PER CLAIM THAN THE CARS OF THE OTHER THREE CAR SIZE GROUPS. THIS WAS TRUE FOR EACH MODEL YEAR AND FOR EACH CAR-AGE GROUP STUDIED. FOUR-DOOR MODELS IN GENERAL DISPLAYED LOWER COLLISION CLAIM FREQUENCIES AND AVERAGES THAN CORRESPONDING TWO-DOOR MODELS. WITHIN EACH CAR SIZE GROUP, SPORTS AND SPECIALTY CARS GENERALLY HAD THE WORST LOSS RESULTS. THE 1977 MODEL INTERMEDIATES, CARS WITH WHEELBASES GREATER THAN 111 INCHES AND LESS THAN OR EQUAL TO 120 INCHES, ACCOUNTED FOR NEARLY 60% OF ALL EXPOSURE, A SUBSTANTIALLY HIGHER PERCENTAGE THAN IN PREVIOUS MODEL YEARS. THE GENERAL MOTORS 1977 WHEELBASE REDUCTION (DOWNSIZING) OF MANY OF ITS FORMER FULL-SIZE MODELS HAD A SIGNIFICANT IMPACT ON THE COLLISION LOSS EXPERIENCE OF 1977 MODELS. RESULTS ARE DISCUSSED BY CAR SIZE GROUPS, DISTRIBUTION OF EXPOSURE, VARIATIONS BETWEEN INDIVIDUAL SERIES, AND VARIATIONS WITHIN SIZE GROUP AND SUBGROUP. APPENDICES PRESENT DETAILED RESULTS FOR EACH OF THREE MODEL YEARS.

HWY. LOSS DATA INST., WATERGATE 600, WASHINGTON, D.C. 20037
Rept. No. RES-REPT-HLDI-R77-2; 1977; 101P
Availability: CORPORATE AUTHOR

HS-022 435

OBSERVATIONS OF FUEL SAVINGS DUE TO THE INTRODUCTION OF RIGHT TURN ON RED

A BEFORE-AND-AFTER COMPARISON OF DATA COLLECTED BY DRIVING ON A FIXED CIRCUIT IN DOWNTOWN DETROIT, MICH., SHOWED A 6% DECREASE IN FUEL CONSUMPTION AND A 12% DECREASE IN TRAVEL TIME AFTER THE INTRODUCTION OF THE GENERALLY PERMISSIVE RIGHT-TURN-ON-RED POLICY. THE EXPERIMENT CONSISTED OF DRIVING REPEATED TRIPS IN AN INSTRUMENTED CAR AROUND A TWO BLOCK BY FOUR BLOCK RECTANGULAR ROUTE DURING THE TWO-WEEK PERIODS IMMEDIATELY PRECEDING AND FOLLOWING THE CHANGE IN THE LAW. THE OBSERVED FUEL CONSUMPTION WAS IN SATISFACTORY AGREEMENT WITH RESULTS CALCULATED FROM THE OBSERVED TRIP TIME USING A PREVIOUSLY DEVELOPED LINEAR MODEL. SAVINGS OF BOTH FUEL AND TIME WERE GREATER IN OFF-PEAK TRAFFIC THAN IN THE AFTERNOON RUSH HOUR. OF THE TOTAL TIME SAVED, MOST (63%) WAS SAVED IN BLOCKS INVOLVING A RIGHT TURN ON RED, BUT 37% OCCURRED ON OTHER BLOCKS. SIMILARLY, MOST OF THE TIME SAVINGS CONSISTED OF REDUCED STOPPED DELAY, BUT THERE WAS ALSO A 35% REDUCTION IN RUNNING TIME. PEDESTRIAN TRAFFIC SEEMED TO BE ABOUT AS SIGNIFICANT A FACTOR AS VEHICULAR TRAFFIC IN DELAYING RIGHT TURNS ON RED.

by MAN-FENG CHANG; LEONARD EVANS; ROBERT HERMAN; PAUL WASIELEWSKI
GENERAL MOTORS RES. LABS., TRAFFIC SCIENCE DEPT., WARREN, MICH. 48090
Rept. No. GMR-2454; 1977; 21P 9REFS
Availability: CORPORATE AUTHOR

HS-022 436

TRAFFIC SPEEDS. INTERIM REPORT NO. 103, OCT DEC 1977

A QUARTERLY REPORT IS MADE ON A STUDY OF FREE-FLOWING AUTOMOBILE AND TRUCK SPEEDS ON RURAL, TANGENT, LEVEL SECTIONS OF INTERSTATE, FOUR-LANE AND TWO-LANE AND OF URBAN INTERSTATE HIGHWAYS IN INDIANA. SPOT SPEED OBSERVATIONS WITH A RADAR SPEED METER WERE MADE AT 14 SPEED MONITORING STATIONS SEVEN OF WHICH WERE CONTROL STATIONS AND SEVEN OF WHICH WERE SELECTED AT RANDOM. ALL OBSERVATIONS WERE MADE DURING DAYLIGHT AND UNDER FAVORABLE CONDITIONS. THE AVERAGE SPEED OF PASSENGER CARS AND TRUCKS HAS INCREASED SINCE THE JUL-SEP 19

PASSENGER CARS AND ALL TRUCKS WAS 58.7 MPH, 1.2 MPH HIGHER THAN THE PREVIOUS PERIOD. THE OVERALL AVERAGE SPEED FOR PASSENGER CARS AND ALL TRUCKS WAS 59.3 MPH AND 58.1 MPH RESPECTIVELY. THE AVERAGE SPEEDS OF PASSENGER CARS AND OF HEAVY TRUCKS WERE FOUND TO BE 1.5 MPH AND 0.8 MPH GREATER, RESPECTIVELY, THAN FOR THE PREVIOUS PERIOD. THE PERCENTAGE OF ALL VEHICLES TRAVELING MORE THAN 5 MPH ABOVE THE SPEED LIMIT INCREASED TO 36% WHILE 11% WERE MORE THAN 10 MPH ABOVE THE 55 MPH LIMIT. THE LARGEST INCREASE OCCURRED ON RURAL INTERSTATES. QUARTERLY DATA ARE COMPARED IN TABLES WITH OTHER RECENT STUDY PERIODS FOR SEVERAL TYPES OF HIGHWAYS FOR PASSENGER CARS AND TRUCKS. COLLECTED DATA ARE TABULATED IN THE APPENDIX.

by J. R. MEKEMSON; G. K. STAFFORD
PURDUE UNIV., JOINT HWY. RES. PROJ., CIVIL ENGINEERING BLDG., WEST LAFAYETTE, IND. 47907
HPR-1(15)-PT-1
Rept. No. JHRP-77-23; 1977; 47P
Availability: NTIS

HS-022 437

ENERGY EFFECTS, EFFICIENCIES, AND PROSPECTS FOR VARIOUS MODES OF TRANSPORTATION

VARIOUS MODES OF PASSENGER TRAVEL AND FREIGHT MOVEMENT ACCOUNT FOR ONE QUARTER OF THE TOTAL ENERGY AND ONE HALF OF THE PETROLEUM USED IN THE U.S. COMPARISONS OF ENERGY USE BY VARIOUS MODES MUST INCLUDE CONSIDERATION OF FACTORS SUCH AS LOAD FACTOR, CIRCUITY, EMPTY BACKHAULS, SPEED, NATURE OF CARGO, SAFETY, COSTS, SOCIAL ACCEPTANCE, AND ALL-WEATHER CHARACTERISTICS. THE DEMAND FOR PASSENGER TRANSPORTATION IS RELATIVELY PRICE INELASTIC. NEITHER FUEL ECONOMY NOR ENERGY INTENSIVENESS IS OR WILL BE THE SOLE FACTOR IN CHOICE OF PASSENGER TRANSPORTATION MODES UNLESS THE PRICE OF ENERGY IS GREATLY INCREASED. CURRENT ENERGY INTENSIVENESS OF PASSENGER AUTOMOBILES RANGES FROM 2310 TO 7400 BTU PER PASSENGER-MILE. BUS EFFICIENCY RANGES FROM 743 TO 2681 BTU PER PASSENGER-MILE. CURRENT ENERGY CONSUMPTION FOR RAIL PASSENGER SERVICE VARIES FROM 1646 TO 3533 BTU PER PASSENGER-MILE. BICYCLES ARE THE MOST EFFICIENT MEANS OF PASSENGER TRANSPORTATION, REQUIRING EVEN LESS ENERGY THAN WALKING. FREIGHT TRANSPORTATION CURRENTLY CONSUMES ABOUT 28% OF TRANSPORTATION ENERGY. INTERCITY COMBINATION TRUCKS HAVE AN AVERAGE EFFICIENCY OF ABOUT 2700 BTU PER TON-MILE AND SINGLE UNIT TRUCKS AVERAGE ABOUT 8000 BTU PER TON-MILE. OPPORTUNITIES FOR REDUCING TRANSPORTATION ENERGY FALL INTO FIVE CATEGORIES: SHIFT TO MORE EFFICIENT MODES; INCREASE LOAD FACTORS; REDUCE DEMAND; INCREASE ENERGY CONSERVATION EFFICIENCY; AND IMPROVE USE PATTERNS. IMPROVING HIGHWAY VEHICLE EFFICIENCY WILL BE THE MOST IMPORTANT OPTION IN TERMS OF ENERGY SAVING POTENTIAL IN THE NEXT DECADE. LOAD FACTOR IMPROVEMENTS COULD ADD SIGNIFICANTLY TO ENERGY EFFICIENCY. APPENDICES INCLUDE ENERGY EQUIVALENTS AND ENERGY CONVERSION FACTORS, AND DETAILED CONCLUSIONS OF "POTENTIAL FOR MOTOR VEHICLE FUEL ECONOMY IMPROVEMENT: REPORT TO THE U.S. CONGRESS."

TRANSPORTATION RES. BOARD, NATIONAL RES. COUNCIL, WASHINGTON, D.C. 20418
Rept. No. NCHRP-SYNTHESIS-43; 1977; 67P 59REFS
SPONSORED BY AMERICAN ASSOC. OF STATE HWY. AND TRANSPORTATION OFFICIALS AND FEDERAL HWY. ADMINISTRATION.
Availability: TRANSPORTATION RES. BOARD, NATIONAL ACAD. OF SCIENCES, 2101 CONSTITUTION AVE., N.W., WASHINGTON, D.C. 20418 $4.80

HS-022 438

A SURVEY OF USE OF LEFT-TURN-ON-RED. INTERIM REPORT

A SURVEY WAS CONDUCTED TO DETERMINE THE EXTENT TO WHICH A LEFT TURN ON RED SIGNAL (LTOR) HAS BEEN USED ACROSS THE COUNTRY AND TO GAUGE HOW EFFECTIVE IT HAS BEEN. CITY TRAFFIC ENGINEERS IN 55 CITIES REPRESENTING 45 STATES AND THE DISTRICT OF COLUMBIA WERE SURVEYED, YIELDING 43 RESPONSES (78%). OF THE CITIES RESPONDING, 22 EITHER HAVE HAD PAST EXPERIENCE WITH LTOR OR HAVE RECENTLY ENACTED AN ORDINANCE WHICH WILL ALLOW LTOR IN THE FUTURE. MOST LTOR LAWS LIMIT ITS USE TO INTERSECTIONS OF TWO ONE-WAY STREETS. OF 22 CITIES WEST OF THE MISSISSIPPI RIVER, 15 ALLOWED LTOR WHILE ONLY 7 OF 21 CITIES EAST OF THE MISSISSIPPI RIVER ALLOWED LTOR. THIS IS SIMILAR TO THE EARLY DEVELOPMENT OF RIGHT TURN ON RED (RTOR) WHICH WAS ONCE USED ALMOST EXCLUSIVELY IN WESTERN STATES. ONLY ONE OF 19 CITIES HAVING EXPERIENCE WITH LTOR RECOMMENDED THAT IT NOT BE USED IN KENTUCKY. THE REASON STATED WAS THAT ONLY A FEW INTERSECTIONS WOULD BE INVOLVED, AND THE DANGER AND CONFUSION WOULD OUTWEIGH THE BENEFITS. MOST LTOR LAWS WERE STATE LAWS, ALTHOUGH SOME WERE CITY ORDINANCES. APPENDICES INCLUDE TABULATED SURVEY INFORMATION AND LTOR LAWS.

by KENNETH R. AGENT
KENTUCKY DEPT. OF TRANSPORTATION, DIV. OF RES., 533 S. LIMESTONE, LEXINGTON, KY. 40508
KYP-75-70
Rept. No. RR-446; 1976; 12P
Availability: CORPORATE AUTHOR

HS-022 439

DRIVING HAZARDS YOU WOULD RATHER NOT FACE [VEHICLE EQUIPMENT BREAKDOWNS]

SOME VEHICLE EQUIPMENT FAILURES WHILE DRIVING CAN BE DANGEROUS RATHER THAN SIMPLY FRUSTRATING, AND REQUIRE A READINESS TO USE

FAIL, THE DRIVER SHOULD INSTANTLY STEER AWAY FROM OBSTACLES AND STEP HARDER ON THE BRAKE PEDAL. THE BRAKES CAN ALSO BE PUMPED AND EMERGENCY BRAKE APPLIED. OTHER EMERGENCY MEASURES DURING BRAKE FAILURE INCLUDE SHIFTING TO A LOWER GEAR, TURNING THE ENGINE OFF, AND RUBBING THE TIRES ON A CURB TO REDUCE ROLLING MOTION. WHEN THE GAS PEDAL STICKS OPEN, THE ENGINE SHOULD BE SWITCHED OFF. DIRT, A HEAVY JACKET OR A BLANKET CAN BE USED ON SMALL AUTOMOBILE FIRES IF AN EXTINGUISHER IS NOT AVAILABLE. SEVERE WOBBLING OR A LOUD RATTLING NOISE OFTEN INDICATES THAT LUG NUTS OR THE WHEEL ARE LOOSE AND SHOULD BE TIGHTENED OR REPLACED. WHEN A TIRE PUNCTURES, EASY AND CONSTANT PRESSURE SHOULD BE APPLIED TO THE BRAKES TO SLOW DOWN AND GET OFF THE ROAD. TIRES SHOULD BE CHANGED ONLY ON A LEVEL SURFACE. WINDSHIELD WIPER FAILURE CAN OFTEN BE CORRECTED BY REMOVING DEBRIS AND TIGHTENING THE ARMS. THE OIL PRESSURE WARNING LIGHT INDICATES NEED FOR MORE OIL BEFORE THE CAR IS DRIVEN FURTHER. THE ALTERNATOR LIGHT OFTEN INDICATES FAN BELT AND WATER PUMP PROBLEMS. UNIVERSAL JOINT FAILURES USUALLY OCCUR SLOWLY AND GIVE LOUD CLUNKING NOISES. EXHAUST SYSTEM FAILURES CAN CAUSE FIRES AND NECESSITATE IMMEDIATE STOPPAGE OF DRIVING. ENGINE OVERHEATING AND VAPOR LOCK USUALLY CORRECT THEMSELVES WHEN THE CAR IS STOPPED, HOOD RAISED, AND ENGINE COOLED NATURALLY. WHEN STEERING FAILS BRAKES SHOULD BE APPLIED IMMEDIATELY. HEADLIGHT FAILURE CAN SOMETIMES BE REMEDIED BY FUSE REPLACEMENT. IF THE HOOD POPS OPEN BRAKES SHOULD BE APPLIED SLOWLY WHILE THE CAR IS STEERED OFF THE ROAD. SAFETY FLARES, EMERGENCY FLASHERS, AND RAISED HOODS SHOULD BE USED TO SIGNAL FOR HELP AND WARN OTHER MOTORISTS OF PROBLEMS.

by RICHARD BAUMAN
Publ: CALIFORNIA HWY. PATROLMAN V41 N11 P17, 53-5 (JAN 1978)
1978
Availability: SEE PUBLICATION

HS-022 440

TRUCKS MUSCLE IN ON THE CAR MARKET

A SURPRISINGLY LARGE CONSUMER TRUCK MARKET HAS EMERGED RECENTLY, DEMONSTRATED BY FORD AND CHEVROLET TRUCK SALES EXCEEDING AUTOMOBILE SALES IN SEVERAL U.S. REGIONS DURING 1977. SALES OF LIGHT TRUCKS (PICKUPS, VANS, AND JEEPS, FOR EXAMPLE) REACHED 3.3 MILLION IN 1977, APPROXIMATELY 80% OF THOSE BEING PURCHASED FOR PERSONAL TRANSPORTATION. TRUCKS ADDED AT LEAST ANOTHER 10% TO THE 1977 PASSENGER CAR MARKET. BASIC PRICES, RANGING FROM $3500 TO AROUND $7500, RAN SLIGHTLY HIGHER THAN THOSE OF A TYPICAL NEW AUTOMOBILE. SINCE 1970, UNIT SALES HAVE RISEN AT A COMPOUNDED AVERAGE ANNUAL RATE OF 9% THAT PERIOD SALES OUTSTRIPPED THE INDUSTRY'S CAPACITY. TRUCK MANUFACTURERS FACE IMMEDIATE PROBLEMS OF DECLINING VEHICLE SALES AND THE NATIONAL HWY. TRAFFIC SAFETY ADMINISTRATION'S PROPOSED TIMETABLE FOR TRUCK FUEL-ECONOMY STANDARDS. THE MOST CONSPICUOUS PART OF THE NEW CONSUMER TRUCK MARKET IS YOUTHS WHO PURCHASE VANS. PICKUP TRUCKS ACCOUNT FOR ABOUT 56% OF THE TRUCK MARKET; VANS ARE 22%; MINI-PICKUPS ARE 10% AND SPORTS UTILITY TRUCKS ARE 7%. SUBURBANS AND PASSENGER PICKUPS ARE THE SMALLEST PART OF THE TRUCK MARKET. FOUR-WHEEL DRIVE IS A COMMON OPTION, WHILE THE NUMBER OF AVAILABLE TRUCK OPTIONS OUTSTRIPS THOSE AVAILABLE FOR LUXURY AUTOMOBILES. THE AVERAGE TRUCK BUYER DIFFERS LITTLE FROM THE AVERAGE CAR BUYER REGARDING AGE, AVERAGE INCOME, AND EDUCATION. THE EXPANDED TRUCK MARKET IS ATTRIBUTED IN PART TO AMERICANS' INCREASED EMPHASIS ON MOBILITY AND LEISURE ACTIVITY. FORD AND CHEVROLET CURRENTLY DOMINATE THE TRUCK SALES MARKET.

by CHARLES G. BURCK
Publ: FORTUNE V97 N4 P62-4, 66, 68 (27 FEB 1978)
1978
Availability: SEE PUBLICATION

HS-022 441

SULFATE EMISSIONS FROM VEHICLES ON THE ROAD

EXPERIMENTS HAVE BEEN CONDUCTED TO MEASURE VEHICLE SULFATE EMISSIONS, BY VEHICLE TYPE, AT TWO TUNNELS ON THE PENNSYLVANIA TURNPIKE. STUDIES BEGAN IN 1974 BEFORE THE INTRODUCTION OF CATALYST-EQUIPPED AUTOMOBILES AND CONTINUED INTO 1976 TO ESTABLISH A CATALYST-FREE BASELINE FOLLOWED BY MEASUREMENTS IN SUBSEQUENT YEARS TO WATCH FOR SULFATE INCREASES AS CATALYSTS CAME INTO WIDESPREAD USE. SAMPLING APPARATUS AT ALL STATIONS INCLUDED FILTERS OF VARIOUS TYPES FOR COLLECTING PARTICULATE MATTER, AND WATER-FILLED IMPINGERS FOR COLLECTING SULFUR DIOXIDE. WALL SCRUBBINGS AND GUTTER SAMPLES WERE TAKEN TO ASSESS WALL AND SETTLING LOSSES AND EMISSION/CONSUMPTION SULFUR BALANCE. A SATISFACTORY BALANCE BETWEEN ESTIMATED FUEL SULFUR CONSUMPTION AND OBSERVED EMISSIONS OF SULFUR COMPOUNDS, CORRECTED FOR AMBIENT-AIR CONTRIBUTION, WAS OBTAINED. THE SULFATE CONTRIBUTED BY VEHICLES EVEN IN THE TUNNELS WAS FOUND TO BE GENERALLY MODEST RELATIVE TO RURAL AMBIENT SULFATE LEVELS. AVERAGE SULFATE EMISSION RATES WERE FOUND TO BE ABOUT 30 MG PER KM FROM HEAVY-DUTY DIESEL TRUCKS, LESS THAN 15 MG PER KM FROM CATALYST-EQUIPPED CARS (PROBABLY IN THE RANGE 4 TO 8 MG PER KM) AND PROBABLY LESS THAN 1 MG PER KM FROM NONCATALYST CARS. THE OVERALL SULFUR DIOXIDE TO SULFUR CONVERSION OF THE VEHICL

MENT; DESCRIPTIVE DETAILS OF THE TWO TUNNEL SITES; SAMPLE ANALYSIS PROCEDURE; CAVEATS IN THE TWO TUNNEL EXPERIMENTS; AND DERIVATION EQUATIONS.

by W. R. PIERSON; W. W. BRACHACZEK; R. H. HAMMERLE; D. E. MCKEE; J. W. BUTLER
Publ: JOURNAL OF THE AIR POLLUTION CONTROL ASSOCIATION V28 N2 P123-32 (FEB 1978)
1978; 50REFS
Availability: SEE PUBLICATION

HS-022 442

ACCIDENT/INCIDENT BULLETIN NO. 145. CALENDAR YEAR 1976

ACCIDENT AND INCIDENT REPORTS ARE CATALOGUED FOR ALL RAILROADS DURING 1976, INCLUDING ALL SYSTEMS OF SURFACE TRANSPORTATION OF PERSONS AND PROPERTY OVER RAILS: LINE HAUL FREIGHT AND PASSENGER RAILROADS; SWITCHING AND TERMINAL RAILROADS; AND PASSENGER CARRYING RAILROADS SUCH AS RAPID TRANSIT, COMMUTER, SCENIC, STREET, SUBWAY, ELEVATED, CABLE, AND COG RAILWAYS. OCCUPATIONAL ILLNESS OF EMPLOYEES, DAMAGE TO RAILROAD EQUIPMENT AND STRUCTURES, AND INJURY TO PERSONS, ARISING FROM RAILROAD OPERATION, ARE REPORTED FOR THE PURPOSE OF DISCLOSING HAZARDS ARISING IN THE PROVISION OF CARRIER TRANSPORTATION BY RAIL. THE FIRST PART OF THE REPORT CONTAINS SELECTED TEN-YEAR HISTORY TABLES, INCLUDING AN OPERATIONAL PROFILE AND ACCIDENT/INCIDENT STATISTICS BETWEEN 1967 AND 1976. THE SECOND PART PRESENTS DETAILED TABULATIONS OF CASUALTIES AND DAMAGES BY ACCIDENT CAUSES FOR 1976. THE THIRD SECTION CONTAINS DETAILS OF ACCIDENTS AND CASUALTIES BY RAILROAD. AN APPENDIX PROVIDES EXTRACTS FROM REPORTING RULES AND MISCELLANEOUS DEFINITIONS.

FEDERAL RAILROAD ADMINISTRATION, WASHINGTON, D.C. 20590
Rept. No. ACCIDENT/INCIDENT-BULL-145; 1977; 93P
Availability: CORPORATE AUTHOR

HS-022 443

A COST-EFFECTIVENESS EVALUATION OF HIGHWAY SAFETY COUNTERMEASURES

THE PATTERN OF EXPECTED TRAFFIC FATALITIES AND INJURIES FOR THE NEXT TEN YEARS HAS BEEN EXAMINED IN ORDER TO ISOLATE MAJOR PROBLEM AREAS AND ASSEMBLE AND EVALUATE COUNTERMEASURES THAT MAY BE EFFECTIVE IN DEALING WITH THEM. FOR THE HIGHWAY SAFETY ASPECTS OF THE PROBLEM (AS OPPOSED TO VEHICULAR SAFETY ASPECTS) 13 PROBLEM AREAS WERE IDENTIFIED, INCLUDING BAD DRIVING BEHAVIOR (A MAJOR PORTION OF WHICH IS THE DRINKING DRIVER); ROADSIDE HAZARDS; BICYCLE AND PEDESTRIAN SAFETY; YOUNG DRIVERS; AND MOTORCYCLES. A LIST OF 37 POTENTIAL COUNTERMEASURES DEEMED TO OFFER THE HIGHEST PROMISE OF REDUCING FUTURE HIGHWAY FATALITIES AND INJURIES WAS DEVELOPED AND USED IN ANALYZING INCREMENTAL COSTS AND EFFECTS OVER THE NEXT TEN YEARS. JUDGMENT OF THE EFFECTIVENESS OF EACH COUNTERMEASURE DEPENDS ON ITS OWN UNIQUE VALUE AS A DETERRENT AND SIZE OF THE POPULATION AFFECTED BY ITS DEPLOYMENT. COUNTERMEASURE COSTS ARE ESTIMATED ON A NATIONAL SCALE, WITH EXPECTED EFFECTS REDUCED TO ONE SINGLE-VALUE ESTIMATE. THE FOUR MOST EFFECTIVE HIGHWAY SAFETY COUNTERMEASURES INCLUDE MANDATORY SAFETYBELT USAGE; NATIONWIDE 55 MILES-PER-HOUR SPEED LIMIT; COMBINED ALCOHOL SAFETY ACTION COUNTERMEASURES; AND COMBINED EMERGENCY MEDICAL COUNTERMEASURES. THE TOTAL FOR ALL INCREMENTAL DEPLOYMENTS OF COUNTERMEASURES IS ALMOST $42 BILLION OVER THE NEXT TEN YEARS, WITH PAVED OR STABILIZED SHOULDERS AND BRIDGE WIDENING BEING THE MOST EXPENSIVE. THE TWO MOST COST-EFFECTIVE COUNTERMEASURES ARE MANDATORY SAFETYBELT USAGE, AND NATIONWIDE 55 MILES-PER-HOUR SPEED LIMIT. REPETITION OF THIS TYPE OF ANALYSIS ON A STATE LEVEL IS RECOMMENDED.

by DONALD R. TRILLING
Publ: TRAFFIC QUARTERLY V32 N1 P41-66 (JAN 1978)
1978
Availability: SEE PUBLICATION

HS-022 445

MOTOR VEHICLE SAFETY AND ENVIRONMENT REPORT, INCLUDING RECENT HIGHLIGHTS, ACCOMPLISHMENTS, AND CURRENT PROGRESS

A PROGRESS REPORT ON THE SOCIETY OF AUTOMOTIVE ENGINEERS (SAE) COOPERATIVE EDUCATION PROG. (CEP) COVERS ITS PLANS, VALUES, AND ACCOMPLISHMENTS THROUGH JAN 1978. THROUGH CEP, ENGINEERS AND TECHNICAL EXPERTS DEVELOP STANDARDS, SPECIFICATIONS, RECOMMENDED PRACTICES, TEST METHODS, AND RELATED DOCUMENTS WHICH ARE USED BY GOVERNMENT IN THE REGULATORY PROCESS AND BY INDUSTRY FOR PROCUREMENT, MANUFACTURING, AND DESIGN GUIDANCE. AN ORGANIZATIONAL CHART OF THE CEP MOTOR VEHICLE SAFETY AND ENVIRONMENT TECHNICAL COMMITTEES IS INCLUDED WITH NUMERICAL CODINGS. HIGHLIGHTS OF THE PAST SIX MONTHS (AUG 1977 TO JAN 1978) ARE SUMMARIZED BY COMMITTEE. ACCOMPLISHMENTS OF THE 25 COMMITTEES, WHICH HAVE BEEN GROUPED INTO AREAS OF RELATED INTEREST, ARE LISTED ALPHABETICALLY. AN OUTLINE OF CURRENT PROGRESS ON TECHNICAL COMMITTEE PROJECTS INCLUDES INITIATION AND PROJECTED COMPLETION DATES, AND NOTES ON CURRENT STATUS. AN INDEX BY COMMITTEE IS PROVIDED.

SOCIETY OF AUTOMOTIVE ENGINEERS, INC., COOPERATIVE ENGINEERING PROG., 400 COMMONWEALTH DRIVE, WARRENDALE, PA. 15096
1978; 141P
Availability: CORPORATE AUTHOR

HS-022 446

CAR FOLLOWING DISTANCES ON A FREEWAY DERIVED FROM A HEADWAY DISTRIBUTION MODEL

A TWO-COMPONENT VEHICULAR HEADWAY DISTRIBUTION MODEL CALLED THE SEMI-POISSON MODEL HAS BEEN APPLIED TO A LARGE QUANTITY OF OBSERVED SINGLE-LANE FREEWAY HEADWAY DATA IN ORDER TO INVESTIGATE DRIVER CAR FOLLOWING PATTERNS IMPLIED BY THE MODEL, PARTICULARLY AS A FUNCTION OF TRAFFIC FLOW LEVEL. THE MODEL IS BASED ON THE CONCEPT OF DIVISION OF VEHICLES INTO LEADERS AND FOLLOWERS. HEADWAYS ARE DEFINED AS TIME INTERVALS BETWEEN SUCCESSIVE VEHICLE ARRIVALS IN A SINGLE LANE THAT CAN BE OBSERVED FROM A POINT ALONG THE ROAD. DATA WERE GATHERED AT A SIX-LANE DIVIDED URBAN FREEWAY IN DETROIT, WITH AN OBSERVER STATIONED ON AN OVERPASS CLOSING A SWITCH AS VEHICLES PASSED A REFERENCE LINE. A TOTAL OF 32 HOURS OF DATA WERE COLLECTED, CONSISTING OF 42,000 HEADWAYS. A PREVIOUSLY DEVELOPED COMPUTATIONAL METHOD IS USED IN WHICH THE DISTRIBUTION OF FOLLOWERS HEADWAYS IS CALCULATED DIRECTLY FROM THE OBSERVED TOTAL HEADWAY DISTRIBUTION BY NUMERICALLY SOLVING AN INTEGRAL EQUATION WITHOUT INTRODUCING A PARAMETRIC FORM FOR THE FOLLOWERS DISTRIBUTION. THE RESULTING DISTRIBUTION OF FOLLOWERS HEADWAYS IS APPROXIMATELY INDEPENDENT OF THE FLOW OVER THE RANGE FROM 900 TO 2000 VEHICLES PER LANE PER HOUR WITH A MEAN OF 1.3 SECONDS AND A STANDARD DEVIATION OF 0.5 SECONDS. RESULTS ARE PRESENTED IN TABULATED AND GRAPHIC FORM.

by PAUL WASIELEWSKI
GENERAL MOTORS RES. LABS., TRAFFIC SCIENCE DEPT., WARREN, MICH. 48090
Rept. No. GMR-2475; 1977; 35P 7REFS
Availability: CORPORATE AUTHOR

HS-022 447

THE EFFECTIVENESS OF TRAFFIC SAFETY MATERIAL IN INFLUENCING THE DRIVING PERFORMANCE OF THE GENERAL DRIVING POPULATION. FINAL REPORT

A STUDY HAS BEEN CONDUCTED TO DETERMINE IF TRAFFIC SAFETY CAMPAIGN MATERIALS ARE EFFECTIVE IN REDUCING THE SUBSEQUENT ACCIDENT AND CONVICTION RECORD OF THE GENERAL DRIVING POPULATION. EFFECTIVENESS OF SPECIFIC TOPICS COVERED BY THE MATERIALS WAS EVALUATED, AS WAS THE EFFECTIVENESS OF MATERIALS TAILORED FOR SPECIFIC AGE-SEX GROUPS. SEVEN TRAFFIC SAFETY BOOKLETS WERE SPECIFICALLY DEVELOPED. THREE TYPES OF MATERIALS ADDRESSED EDUCATIONAL ASPECTS; HUMAN FACTORS SUCH AS EMOTIONS AND ATTITUDES; AND HIGHWAY SIGNS AND STREET MARKINGS. SOME 2660 SUBJECTS WERE LICENSED CALIFORNIA DRIVERS VEHICLE (DMV) FILES. THESE SUBJECTS RECEIVED A PAMPHLET AND AN 11-ITEM ATTITUDE QUESTIONNAIRE BY MAIL. RESULTS INDICATED THAT TRAFFIC SAFETY CAMPAIGN MATERIALS WERE NOT EFFECTIVE IN REDUCING SUBSEQUENT SIX MONTH ACCIDENT AND CONVICTION FREQUENCIES. NEITHER THE TOPIC NOR THE TAILORING OF THE MATERIAL SHOWED ANY EFFECT ON SUBSEQUENT DRIVING RECORD. AGE AND SEX OF THE RECIPIENT DID NOT MODERATE THE EFFECT OF THE MATERIAL ON SUBSEQUENT DRIVING RECORD. REASONS FOR LACK OF IMPACT OF MATERIALS ON DRIVERS MAY HAVE BEEN DUE TO FAILURE TO READ PAMPHLETS, CONFUSING FORM OF PRESENTATION OF MATERIALS, OR LACK OF RETENTION OR INCENTIVE. RECOMMENDATION IS MADE THAT THE DMV NOT INCORPORATE THESE SAFETY MATERIALS IN ANY OF ITS ONGOING OPERATIONS. RATHER, OTHER COUNTERMEASURES SHOULD BE DEVELOPED AND EVALUATED. APPENDICES INCLUDE TABULATED STUDY RESULTS.

by JAMES W. ANDERSON
DEPARTMENT OF MOTOR VEHICLES, OFFICE OF PROG. DEVEL. AND EVALUATION, P.O. BOX 1828, SACRAMENTO, CALIF. 95809
B-1-55
Rept. No. FHWA-CAL-DMV-RSS-1269-77-57; HWY-RR-B0155; 1977; 35P 12REFS
PREPARED IN COOPERATION WITH FEDERAL HWY. ADMINISTRATION.
Availability: NTIS

HS-022 448

MANUAL ON CLASSIFICATION OF MOTOR VEHICLE TRAFFIC ACCIDENTS. 3RD ED.

THIS MANUAL IS DESIGNED TO PROVIDE A COMMON LANGUAGE FOR REPORTERS, CLASSIFIERS ANALYSTS, AND USERS OF MOTOR VEHICLE TRAFFIC ACCIDENT DATA IN ORDER TO FACILITATE DEVELOPMENT OF DATA ON ACCIDENTS INVOLVING MOTOR VEHICLES AND OTHER ROAD VEHICLES IN AND OUT OF TRAFFIC. IT IS INTENDED AS A STANDARD FOR STATISTICAL CLASSIFICATIONS OF MOTOR VEHICLE TRAFFIC ACCIDENTS FOR NATIONWIDE USE. THE BODY OF THE MANUAL IS DIVIDED INTO TWO SECTIONS, ONE CONTAINING DEFINITIONS AND ONE CONTAINING CLASSIFICATION INSTRUCTIONS. DEFINITIONS ARE PRESENTED IN AN ORDER WHICH AVOIDS DEPENDENCE UPON SPECIAL TERMS NOT PREVIOUSLY DEFINED. EXCLUSIONS ARE NOTED WHERE THEY APPLY. DEFINITIONS ARE DIVIDED INTO SEVEN SECTIONS: TRANSPORT VEHICLES AND TRANSPORT WAYS; LAND WAYS, LAND VEHICLES, AND USERS; ACCIDENTS; AND INJURIES AND DAMAGE. OTHER SECTIONS ARE LOCATION ROAD VEHICLE ACCIDENT TYPES, AND LOCATION OF ROAD VEHICLE ACCIDENTS. EIGHT CLASSIFICATION CATEGORIES INCLUDE CLASSIFICATIONS OF PERSONS BY INJURY SEVERITY, CLASSIFICATION OF ROAD VEHICLES BY DAMAGE SEVERITY, AND MOTOR VEHICLE CLASSIFICATION. ACCIDENTS ARE CLASSIFIED BY INJURY SEVERITY, DAMAGE SEVERITY, NUMBER OF VEHICLES, FIRST HARMFUL EVEN

AND LOCATION. A MOTOR VEHICLE CLASSIFICATION AND AN INDEX ARE PROVIDED.

NATIONAL SAFETY COUNCIL, COM. ON MOTOR VEHICLE TRAFFIC ACCIDENT CLASSIFICATION, 444 N. MICHIGAN AVE., CHICAGO, ILL. 60611
Rept. No. ANSI-D16.1-1976; 1976; 40P 7REFS
REVISION OF ANSI-D16.1-1970
Availability: CORPORATE AUTHOR

HS-022 449

TRANSPORTATION AND THE ELDERLY AND HANDICAPPED. A LITERATURE CAPSULE

THIS LITERATURE REVIEW IS DESIGNED TO MAKE THE LITERATURE IN TRANSPORTATION CONCERNING THE ELDERLY AND HANDICAPPED MORE ACCESSIBLE TO USERS. AN INTRODUCTION TO THE LITERATURE HIGHLIGHTS THE SCOPE OF CURRENT RESEARCH AND PLANNING IN TRANSPORTATION FOR THE ELDERLY AND HANDICAPPED. INCLUDED, FOR EXAMPLE, IS A GENERAL INTRODUCTORY TEXT ON TRANSPORTATION AND THE DISADVANTAGED. FIVE SELECTED SUMMARIES ARE PRESENTED WHICH COLLECTIVELY INTRODUCE A WIDE RANGE OF TOPICS BEING CONSIDERED IN CURRENT TRANSPORTATION RESEARCH AND PLANNING FOR ELDERLY AND HANDICAPPED PERSONS. THE SUMMARIES ARE BASED ON EXCERPTS FROM FIVE DETAILED STUDIES. AN ANNOTATED BIBLIOGRAPHY OUTLINES 116 RESOURCES IN TRANSPORTATION FROM 1970 TO 1977 WHICH FOCUS ON THE ELDERLY AND HANDICAPPED. LITERATURE SELECTED FOR IDENTIFICATION AND ANNOTATION IS ORGANIZED INTO FIVE CATEGORIES: OVERVIEW, NEEDS, PROGRAMS, PLANNING, AND POLICY. THE MAJORITY OF THE SELECTIONS CATEGORIZED UNDER NEEDS FOCUS ON CONSIDERATIONS IN THE PROVISION OF TRANSPORTATION SERVICE TO ELDERLY AND HANDICAPPED PERSONS. THE POLICY SECTION INCLUDES WORKS WHICH CONCERN LEGISLATIVE, REGULATORY, AND INSTITUTIONAL ASPECTS OF TRANSPORTATION FOR THE ELDERLY AND HANDICAPPED. THE BIBLIOGRAPHY IS ARRANGED WITH REGARD TO TOPICAL SIMILARITY. AN AUTHOR INDEX IS PROVIDED, AS WELL AS A LIST OF SUGGESTED PERIODICALS AND OTHER SOURCES OF CURRENT INFORMATION.

TRANSPORTATION SYSTEMS CENTER, TECHNOLOGY SHARING PROG. OFFICE, KENDALL SQUARE, CODE 151, CAMBRIDGE, MASS. 02142
1977; 82P
Availability: CORPORATE AUTHOR

HS-022 450

NO DAMAGE STEEL BUMPERS - A NEW APPROACH

A NO-DAMAGE STEEL BUMPER SYSTEM INCLUDING BUMPERS AND ENERGY ABSORBERS WHICH WEIGH 1% OF THE VEHICLE GROSS WEIGHT HAS BEEN DESIGNED FOR 1980 VEHICLES AND PROTOTYPE TESTED. A REVIEW OF RESEARCH ON DENT RESISTANCE TECHNOLOGY COVERS INTRINSIC PROTECTION TO FACE, SUPPORT FROM REAR TO FACE, AND REDIRECTION OF IMPACT. DENT RESISTANCE IS FAVORED BY A MATERIAL HAVING HIGH YIELD STRENGTH (CHARACTERISTIC OF STEEL), MORE THICKNESS, AND/OR A LOW MODULUS OF ELASTICITY. DENT RESISTANCE APPEARS TO DEPEND MORE UPON THE PROXIMITY OF THE STRAIGHT LEG SECTIONS TO THE POINT OF LOADING THAN THE CONFIGURATION OF THE FACE. FOAM-BACKED STEEL INCREASES DENT RESISTANCE BUT ENTAILS INCREASED WEIGHT AND DESIGN COSTS. THE LIMITED ACCESS PHILOSOPHY OF BUMPER DESIGN IMPLIES THAT DENTING CAN BE MINIMIZED BY RESTRICTING CONTACT OF THE PENDULUM WITH THE BUMPER TO SPECIFIC LOCATIONS WHERE ACCOMMODATION FOR IMPACT LOADING HAS BEEN MADE. LIMITED ACCESS DESIGN EMPLOYS VARIOUS FORMS OF BUMPERETTE ENERGY ABSORBERS TO PROTECT THE BUMPER ITSELF DURING MOST TYPES OF INITIAL IMPACT. THE LIMITED ACCESS PHILOSOPHY LEADS TO USE OF HIGH STRENGTH STEELS THINNER THAN THOSE CURRENTLY BEING USED FOR BUMPERS. WELDING WILL INCREASE STRENGTH BY ELIMINATING BOLT HOLES IN THE BUMPER. A NONVACUUM ELECTRON BEAM SYSTEM WAS USED TO LAY A FILLET WELD BETWEEN THE CHROMED FACE BAR AND THE REINFORCEMENT. PROTECTION FROM CORROSION IS ACHIEVED USING A GALVANIZED COATING ON THE REINFORCEMENT.

by WILLIAM J. RIFFE
U.S. STEEL CORP., TRANSPORTATION INDUSTRIES MARKET DEVEL.
Rept. No. SAE-770212; 1977; 8P 4REFS
PRESENTED AT INTERNATIONAL AUTOMOTIVE ENGINEERING CONGRESS AND EXPOSITION, DETROIT, 28 FEB-4 MAR 1977.
Availability: SAE

HS-022 451

TRANSPORTATION NOISE BIBLIOGRAPHY

A BIBLIOGRAPHY ON TRANSPORTATION NOISE IS INTENDED FOR USE BY INDIVIDUALS WHO ARE AWARE OF ITS IMPACT BUT HAVE A MINIMUM OF TECHNICAL KNOWLEDGE ON THE SUBJECT. ITEMS INCLUDED ARE THOSE THAT DISSEMINATE BASIC INFORMATION WITH A MINIMUM AMOUNT OF TECHNICAL TERMINOLOGY, WITH FORMATS RANGING FROM SHORT JOURNAL ARTICLES TO LONGER RESEARCH REPORTS ALONG WITH PAPERS FROM CONFERENCE PROCEEDINGS. PREFERENCE IS GIVEN TO 1972-1974 LITERATURE. THE BIBLIOGRAPHY IS DIVIDED INTO NINE TOPICAL SECTIONS (MOST OF WHICH ARE FURTHER SUBDIVIDED), INCLUDING AN OVERVIEW OF SOUND AND THE ELEMENTS OF NOISE; EFFECTS OF NOISE ON PEOPLE; NOISE SOURCES; AND COMMUNITY REACTION TO TRANSPORTATION NOISE. OTHER SECTIONS COVER ECONOMIC ASPECTS OF NOISE CONTROL AND ABATEMENT; METHODS OF MEASURING, SURVEYING, AND EVALUATING ENVIRONMENTAL TRANSPORTATION NOISE; AND LEGAL, ADMINISTRATIVE, AND OPERATIONAL ASPECTS OF IMPLEMENTING NOISE CONTROL AND ABATEMENT PROGRAMS. THE LAST TWO SECTIONS COVER INTERRELATIONSHIP OF NOISE CONTROL, TRANSPORTATION, AND LAND

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USE; AND SUMMARY OF MAJOR APPROACHES TO TRANSPORTATION NOISE CONTROL AND ABATEMENT. EACH ENTRY INCLUDES A CITATION AND A BRIEF SUMMARY. AUTHOR AND SUBJECTS INDEXES ARE INCLUDED, AS WELL AS A GLOSSARY AND A LISTING OF ORGANIZATIONS CONCERNED WITH NOISE.

TRANSPORTATION SYSTEMS CENTER, TECHNOLOGY SHARING PROG. OFFICE, KENDALL SQUARE, CODE 151, CAMBRIDGE, MASS. 02142
1975?; 83P
Availability: CORPORATE AUTHOR

HS-022 452

MODULAR DISPOSABLE CAN (MODCAN) CRASH CUSHION: A CONCEPT INVESTIGATION

AN IMPROVED HIGHWAY CRASH CUSHION SYSTEM REFERRED TO AS A MODULAR DISPOSABLE CAN (MODCAN) CRASH CUSHION IS COMPOSED OF A MODULAR ARRANGEMENT OF DISPOSABLE METAL BEVERAGE CANS CONFIGURED TO SERVE AS AN EFFECTIVE HIGHWAY IMPACT ATTENUATOR SYSTEM. A SERIES OF STATIC TESTS WAS PERFORMED ON SEVERAL DIFFERENT TYPES OF CRUSHABLE ELEMENTS WHICH WERE CONSIDERED AS CANDIDATE ELEMENTS FOR A HIGHWAY CRASH CUSHION SYSTEM, IN ORDER TO GATHER FUNDAMENTAL BASELINE DATA AND TO COMPARE ENERGY-DISSIPATING CHARACTERISTICS OF THE VARIOUS CANDIDATES TO EACH OTHER AND TO THE STANDARD STEEL DRUM CRUSHABLE UNIT. SPHERICAL UNITS, EMPTY ALUMINUM AND STEEL BEVERAGE CANS, AND OTHER ENERGY-DISSIPATING ELEMENTS WERE TESTED. TEST DATA INDICATE THAT FROM A PERFORMANCE, COST, AND PACKAGING POINT OF VIEW THE METAL DISPOSABLE CANS PROVIDE AN ADVANTAGE OVER THE STANDARD 55-GALLON DRUM ATTENUATOR. THE SAME AMOUNT OF ENERGY DISSIPATED BY CRUSHING A DRUM WAS ALSO DISSIPATED BY CRUSHING A CAN ARRANGEMENT IN ABOUT ONE THIRD THE VOLUME REQUIRED FOR THE DRUM. THE MODCAN CONCEPT IS DESIGNED AS A CRUSHABLE BARRIER SYSTEM INTENDED TO CAPTURE VEHICLES DURING IMPACT RATHER THAN REDIRECT THEM INTO THE TRAFFIC FLOW STREAM. THUS IT IS ANALOGOUS TO THE STEEL DRUM DESIGN WITHOUT THE VEHICLE REDIRECTIONAL LIMITATION. THE MODCAN DESIGN IS COMPOSED OF AN ARRAY OF RECTANGULAR PRISM-SHAPED MODULES INTERCONNECTED BY TENSION CROSS-TIES TO DEVELOP SATISFACTORY TRANSFER OF THE CRUSHING LOAD DURING VEHICLE IMPACT. IN FIELD APPLICATION THE DEVICE WOULD BE ANCHORED TO THE ROADWAY SURFACE THROUGH A SERIES OF GUIDEWIRES. THE LOWER CABLE SYSTEM AND THE UPPER TENSION CROSS TIES ARE DESIGNED TO PREVENT GROSS TRANSVERSE BUCKLING DURING LATERAL IMPACT. MODULES ARE COMPOSED OF EMPTY ALUMINUM BEVERAGE CANS ARRANGED WITH THE LONGITUDINAL AXES OF THE

HSL 78-0

GY DISSIPATED BY LONGITUDINALLY CRUSHIN THE MODULE WAS APPROXIMATELY 8400 FEET PE POUND WITH AN AVERAGE CRUSHING FORCE O 4000 POUNDS. THE MODCAN CONCEPT OFFERS TH POTENTIAL FOR SMOOTHER AND SAFER OCCUPAN DECELERATION FOR A LARGER CLASS OF VEHICL IMPACT WEIGHTS THAN DOES THE STEEL DRU DEVICE.

by A. KNOELL; A. WILSON
CALIFORNIA INST. OF TECH., JET PROPULSION LAB. PASADENA, CALIF.
Rept. No. TECHNICAL-MEMORANDUM-33-795; 1976; 27P 4REFS
Availability: CORPORATE AUTHOR $4.00

HS-022 453

SENIOR CITIZENS AND ROAD SAFETY [LE "TROISIEME AGE" ET LA SECURITE ROUTIERE]

SENIOR CITIZENS ARE A MAJOR CATEGORY OF ROA USERS IN FRANCE AND THE GOVERNMENT HA RECENTLY UNDERTAKEN A SAFETY CAMPAIG SPECIFICALLY AIMED AT THEM. CURRENTLY THER ARE MORE THAN 2000 ANNUAL FATALITIES AN 22,000 INJURIES AMONG PEOPLE 65 YEARS OF AC AND OLDER. APPROXIMATELY ONE FATALITY IN SI AND OVER ONE OF EVERY FIFTEEN INJURIES AE SENIOR CITIZENS. TRAFFIC FATALITY AVERAGI HAVE INCREASED FOR THIS GROUP SINCE 19 WHEREAS THE NATIONAL AVERAGE HAS DROPPE PEDESTRIANS COMPRISE THE GREATEST NUMBI (41%) OF SENIOR CITIZEN FATALITIES. MORE THA ONE PEDESTRIAN FATALITY IN THREE IS A SENIC CITIZEN. THE RISK OF A FATAL ACCIDENT TO A ELDERLY PEDESTRIAN IN URBAN AREAS IS THRI TIMES THAT INCURRED BY THE ENTIRE FRENC POPULATION. THESE STATISTICS PROMPTED TE LAUNCHING OF AN INFORMATION CAMPAIC AIMED AT URBAN AREA SAFETY OF PEDESTRIANS AND OVER. THE CAMPAIGN'S PURPOSE IS TO ED CATE THE GENERAL PUBLIC ON SPECIAL TRAFF HAZARDS ASSOCIATED WITH SENIOR CITIZENS AN TO EDUCATE SENIOR CITIZENS REGARDING SPECL PRECAUTIONS WHICH SHOULD BE TAKEN BY THE SENIOR CITIZEN DRIVERS COMPRISE 40% OF SENI CITIZEN FATALITIES; A FATALITY RISK 2.5 TIM GREATER THAN THE AVERAGE. MEN RUN GREATER RISK THAN WOMEN AS PEDESTRIANS BICYCLISTS BUT NOT AS DRIVERS. INTERVIE WITH SENIOR CITIZENS INDICATE THAT REASO FOR PEDESTRIAN ACCIDENTS INCLUDE SLOW RE TION TIMES, POOR SIGHT AND HEARING, AND LA OF ATTENTION TO THE TRAFFIC SITUATION. DERLY PEDESTRIAN ACCIDENTS COULD SOMETIM BE AVOIDED BY SUCH MEASURES AS LONGER R LIGHTS FOR WALKING AND SPECIAL INFRASTRU TURES.

COMITE INTERNATIONAL DE LA SECURITE ROUTIERE, SECRETARIAT GENERAL, FRANCE
1977; 16P
TEXT ALSO IN FRENCH.

HS-022 454

CITY OF STOCKTON, STOCKTON POLICE DEPARTMENT, SELECTIVE TRAFFIC ENFORCEMENT PROGRAM (S.T.E.P.). FINAL REPORT

A DESCRIPTION IS PRESENTED OF THE STOCKTON, CALIF., POLICE DEPT.'S SELECTIVE TRAFFIC ENFORCEMENT PROG. (S.T.E.P.) AND ITS ACCOMPLISHMENTS FROM ITS INITIATION IN 1 JAN 1973 UNTIL ITS COMPLETION 18 MONTHS LATER. THE PROGRAM'S OBJECTIVE WAS TO DEMONSTRATE THE EFFECTIVENESS OF HIGHLY SELECTIVE AND INNOVATIVE TRAFFIC LAW ENFORCEMENT, WHEN APPLIED COMMENSURATE WITH ACCIDENT EXPERIENCE BY TIME, LOCATION, CAUSATION AND SOCIAL ENVIRONMENT, IN PREVENTING AND REDUCING THE SEVERITY OF TRAFFIC ACCIDENTS AND IN OBTAINING VOLUNTARY COMPLIANCE WITH TRAFFIC REGULATIONS BY THE MOTORING PUBLIC. THE PROGRAM WAS BASED PRIMARILY ON THE THREE "E'S," EDUCATION, ENFORCEMENT AND ENGINEERING. IT WAS DESIGNED TO EDUCATE THE MOTORING PUBLIC AS WELL AS S.T.E.P. OFFICERS AND THE FIELD OPERATIONS PERSONNEL WITH REGARD TO TRAFFIC SAFETY, ITS ENFORCEMENT AND ENGINEERING. A CLOSE RELATIONSHIP WITH THE CITY'S TRAFFIC ENGINEERS WAS ESTABLISHED IN AN EFFORT TO ELIMINATE ANY HAZARDOUS TRAFFIC AREAS. SOME DATA ON THE CITY OF STOCKTON'S ACCIDENT HISTORY DURING THE 18-MONTH OPERATION OF S.T.E.P. ARE AS FOLLOWS: DEATHS, 28 (JAN 1972-JUN 1973) AND 24 (JAN 1973-JUN 1974); INJURY COLLISIONS, 1706 (JAN 1972-JUN 1973) AND 1499 (JAN 1973-JUN 1974); AND COLLISIONS, 7745 (JAN 1972-JUN 1973) AND 6505 (JAN 1973-JUN 1974). ALSO, THERE WAS A REDUCTION IN INJURY AND NONINJURY COLLISIONS FOR THE FIRST 12 MONTHS OF THE S.T.E.P. AS COMPARED TO THE PRECEDING 12-MONTH PERIOD. THE EFFECTIVENESS OF S.T.E.P. IS CLEARLY SHOWN IN THE BEGINNING OF ITS OPERATION, WITH A LEVELING-OUT TREND AT THE PROGRAM'S CONCLUSION.

STOCKTON POLICE DEPT., 22 E. MARKET ST., STOCKTON, CALIF. 95202
NHTSA-157323
1974; 213P
Availability: CORPORATE AUTHOR

HS-022 455

FATAL CAR-INTO-TRUCK/TRAILER UNDERRIDE COLLISIONS

TO ESTIMATE THE CURRENT NATIONAL FREQUENCY OF UNDERRIDE COLLISIONS AND TO ASSESS THE EFFECTIVENESS OF UNDERRIDE GUARDS USED ON LARGE TRUCKS AND TRACTOR-TRAILERS, EXAMINATION WAS MADE OF ALL FATAL CAR/TRUCK COLLISION CASES IN MICHIGAN BETWEN 1972 AND 1976 AND IN TEXAS BETWEEN 1975 AND 1976. THE IMPACT LICE OFFICERS. RELATIVE IMPACT SPEED WAS ESTIMATED FOR EACH CASE. AN ESTIMATE BASED ON THE MULTIYEAR DATA PUTS THE CURRENT NUMBER OF FATAL CAR-INTO-TRUCK UNDERRIDE COLLISIONS AT 456 NATIONALLY, INCLUDING 261 REAR IMPACTS AND 195 SIDE IMPACTS. AN ESTIMATE BASED ON ONLY THE 1976 DATA PUTS THE CURRENT NATIONAL TOTAL AT 571, INCLUDING 308 REAR IMPACTS AND 263 SIDE IMPACTS. OF THE 181 CAR/TRUCK FATAL CRASHES STUDIED, UNDERRIDE OCCURRED IN MORE THAN 90% OF THE REAR COLLISIONS AND IN 75% OF THE SIDE COLLISIONS. IMPACT SPEED WAS GREATER THAN 30 MILES PER HOUR IN 77% OF THE CASES. THE FREQUENCY OF SUCH COLLISIONS WOULD BE REDUCED IF TRUCKS AND TRAILERS WERE MADE MORE CONSPICUOUS, AND THE FREQUENCY OF UNDERRIDES IN CAR-INTO-TRUCK COLLISIONS WOULD BE REDUCED IF TRUCKS AND TRAILERS WERE EQUIPPED WITH IMPROVED UNDERRIDE GUARDS.

by DANIEL J. MINAHAN; JAMES O'DAY
Publ: HSRI RESEARCH REVIEW V8 N3 (NOV-DEC 1977)
1977; 19P
Availability: SEE PUBLICATION

HS-022 456

A STUDY OF MEASURES TO IMPROVE PEDESTRIAN AND BICYCLE SAFETY

A STUDY TO IDENTIFY AND EVALUATE, IN TERMS OF COST-EFFECTIVENESS AND COMMUNITY IMPACTS, VARIOUS MEASURES CAPABLE OF IMPROVING THE SAFETY OF THE PEDESTRIAN AND BICYCLE TRANSPORTATION ENVIRONMENT IN MEDIUM-SIZED CANADIAN CITIES, USED A SAMPLE OF 400 PEDESTRIAN AND BICYCLE ACCIDENTS (100 EACH FROM HAMILTON, LONDON, WINNIPEG, AND CALGARY) WHICH OCCURRED IN THE YEARS 1974 AND 1975. AN "AVERAGE" MEDIUM-SIZED CANADIAN CITY WAS GENERALIZED AND SPLIT INTO THE FOLLOWING THREE CITY ZONES: THE CORE, COMPRISING THE CENTRAL BUSINESS DISTRICT AND THE ADJACENT COMMERCIAL AND INSTITUTIONAL AREAS; THE FRAME, BEING A RING OF OLDER RESIDENTIAL AREAS WITH COMMERCIAL AND RETAIL STRIP DEVELOPMENTS; AND THE FRINGE, CONTAINING PRINCIPALLY RESIDENTIAL SUBURBS, WITH COMMUNITY FACILITIES, SCHOOLS, INDUSTRIAL PARKS, AND REGIONAL SHOPPING CENTERS. THE ANALYSIS OF THE ACCIDENT SAMPLE SHOWED THAT ONLY 10% OF THE ACCIDENTS OCCURRED IN CORE AREAS, DESPITE THE VERY HIGH LEVELS OF PEDESTRIAN AND VEHICLE ACTIVITY. FRAME AREAS ACCOUNTED FOR 52.5% OF THE ACCIDENTS AND FRINGE AREAS 37.5%. THE LARGEST SINGLE COMPONENT OF THE SAMPLE WAS ACCIDENTS OCCURRING TO CHILDREN 14 YEARS OF AGE AND UNDER, IN RESIDENTIAL NEIGHBORHOODS IN FRAME AND FRINGE AREAS. SAFETY MEASURES WHICH APPEAR TO HOLD SOME PROMISE IN IMPROVING THE PEDESTRIAN AND BICYCLE ENVIRONMENTS ARE AS

LOCATED TO THE FRONT OF HOUSES AND PEDESTRIAN WAYS AND OPEN SPACE TO THE REAR, RESULTING IN A SUPERBLOCK PATTERN WITH INTERNAL PARKS SURROUNDED BY ARTERIAL ROADS); AND TRAFFIC ENGINEERING MEASURES (ONE-WAY STREETS, MEDIAN ISLANDS, MEDIAN BARRIERS, ELIMINATION OF ON-STREET PARKING, AND OUTSIDE LANE OR SHOULDER FOR CYCLISTS). PEDESTRIAN AND CYCLIST ACCIDENT DATA ARE SHOWN IN GRAPHS AND TABLES.

N. D. LEA AND ASSOCIATES, OTTAWA, ONT., CANADA
Rept. No. TP-1004; 1976?; 218P 195REFS
Availability: TRANSPORT CANADA, RD. AND MOTOR VEHICLE TRAFFIC SAFETY BRANCH, OTTAWA, ONT., CANADA

HS-022 457

A DOPPLER RADAR VELOCITY METER FOR AGRICULTURAL TRACTORS

A METHOD BASED ON THE APPLICATION OF MODERN SOLID STATE MICROWAVE DOPPLER RADAR FOR MONITORING THE VELOCITY OF AGRICULTURAL TRACTORS HAS BEEN DEVELOPED. IN CONTINUOUS WAVE DOPPLER RADAR, THE TRANSMITTER SENDS OUT CONTINUOUS ELECTROMAGNETIC SIGNALS AND THE RECEIVER CONTINUOUSLY DETECTS THE RETURN SIGNALS. THESE SIGNALS CARRY INFORMATION ON THE RELATIVE VELOCITY OF THE RADAR WITH RESPECT TO THE REFLECTING TARGET, DUE TO THE DOPPLER EFFECT. MEASUREMENTS OBTAINED ON AN ASPHALT ROAD, A GRAVEL ROAD, AND PLOUGHED AND GRASS-COVERED FIELDS INDICATE THAT SMALL VIEWING ANGLES ARE DESIRABLE TO MINIMIZE ERROR IN GROUND VELOCITY MEASUREMENTS. IN THIS RESEARCH A FREQUENCY OF 10.525 GHZ WAS CHOSEN, AND A HORN ANTENNA. ROUGHER SURFACES AND LARGER VIEWING ANGLES WERE FOUND TO GIVE GREATER RETURN AND LARGER SIGNAL-TO-NOISE RATIOS. VERTICAL POLARIZATION OF THE ANTENNA BEAM PROVIDES A LARGER BACK-SCATTERED SIGNAL THAN DOES THE HORIZONTAL POLARIZATION, PARTICULARLY AT LOWER VIEWING ANGLES. USING TWO DOPPLER MODULES, MA-86656A (MICROWAVE ASSOCIATES) AND GE 2071 (GENERAL ELECTRIC) AND A FIFTH WHEEL ASSEMBLY TO MONITOR TRUE GROUND VELOCITY, DIFFERENCES BETWEEN THE VELOCITIES MEASURED BY BOTH METHODS WERE BELOW 0.5% TO 2.0%.

by STANISLAW S. STUCHLY; ARTNARONG THANSANDOTE; JOSEF MLADEK; JAMES S. TOWNSEND
Publ: TRANSACTIONS ON VEHICULAR TECHNOLOGY VVT-27 N1 P24-30 (FEB 1978)
1978; 17REFS
Availability: SEE PUBLICATION

HS-022 458

A NEW IGNITION TIMING CONTROL METHOD USING DUAL-SLOPE INTEGRATION

A POTENTIALLY USEFUL METHOD OF REDUCING POLLUTANTS IN AUTOMOBILE EXHAUST GAS AND REDUCING FUEL CONSUMPTION IS THE OPTIMUM CONTROL METHOD FOR IGNITION TIMING OF THE MIXTURE. OPTIMUM IGNITION TIMING VARIES WITH THE STATE OF ENGINE OPERATION. MOREOVER, IT IS A COMPLEX FUNCTION INVOLVING PARAMETERS OF ENGINE OPERATING STATE. IGNITION TIMING IS USUALLY EXPRESSED AS THE MEASURE OF ANGULAR DISPLACEMENT OF THE ENGINE SHAFT WITH VARYING ROTATIONAL SPEED, SO THAT ITS CONTROL MUST DEPEND ON CONTINUOUS PHASE CONTROL TECHNIQUES. DUAL-SLOPE INTEGRATION AS A METHOD OF THIS PHASE CONTROL IS PROPOSED. A SPECIAL FEATURE OF THIS METHOD IS THAT THE PHASE ANGLE BETWEEN SIGNALS FOR EACH REFERENCE ANGLE INPUT INTERMITTENTLY CAN BE DETERMINED IN TERMS OF LINEAR FUNCTIONS OF REPETITION FREQUENCY OF THE SIGNALS. BY VARYING THE TIME CONSTANTS OF INTEGRATION AND THE LEVEL OF COMPARISON WITH THE INTEGRATION VALUE, EVEN MORE COMPLEX MULTIVARIANT FUNCTIONS CAN BE GENERATED. THE BASIC CIRCUIT CONFIGURATION IN PHASE CONTROL BY DUAL-SLOPE INTEGRATION IS MADE UP OF AN INTEGRATOR AND A COMPARATOR. THESE COMPONENTS LEND THEMSELVES TO STANDARDIZATION AND CAN READILY FORM INTEGRATED CIRCUITS WITH THE GROUP OF LOGIC GATES USED IN SYNTHESIZING IGNITION TIMING. FROM THE ENGINE SHAFT, TWO SIGNAL TRANSITIONS ARE OBTAINED FOR EVERY IGNITION CYCLE IN AN IGNITION CONTROLLER APPLYING THIS PRINCIPLE. THE PROTOTYPE CONTROLLER HAS IGNITION TIMING CHARACTERISTICS THAT CONTAIN A TERM OF THE PRODUCT OF THE TWO VARIABLES, ENGINE SPEED AND INLET MANIFOLD VACUUM. THE CONTROLLER MEETS OPTIMUM IGNITION TIMING CHARACTERISTICS REQUIRED IN ACTUAL AUTOMOBILES. CONTROLLER CHARACTERISTICS COULD BE APPROXIMATED MORE CLOSELY TO THOSE REQUIRED BY THE ENGINE THAN IS POSSIBLE WITH CONVENTIONAL SPARK ADVANCERS, RESULTING IN CLEANER EXHAUST GAS AND BETTER FUEL ECONOMY.

by TAKAO SASAYAMA; SHINICHI SAKAMOTO; YASUNORI MOURI
Publ: TRANSACTIONS ON VEHICULAR TECHNOLOGY VVT-27 N1 P35-41 (FEB 1978)
1978; 3REFS
Availability: SEE PUBLICATION

HS-022 459

PRACTICAL APPLICATION OF RESEARCH PROVIDES NEW TOOLS FOR THE TRAFFIC

TIVE LINES HAVE BEEN USED FOR ABOUT 55 YEARS IN THE U.S. TRUCK-MOUNTED CONTINUOUS LINE STRIPER MACHINES WERE DEVELOPED IN 1922 TO REPLACE HAND PAINTING. BENEFITS OF THE CENTER LINE STRIPE WERE SOON REALIZED AND STRIPING SPREAD TO MANY HIGHWAY AGENCIES AS THE FIRST OF MANY TYPES OF TRAFFIC MARKINGS. REFLECTIVE WHITE LINES FOR NIGHTTIME DRIVING WERE DEVELOPED IN 1930, BUT THEIR DESIGN RENDERED THEM INEFFECTIVE DURING RAIN OR FOG. THE USE OF RAISED REFLECTIVE MARKERS HAS RECENTLY SUPERCEDED PAINTED OR THERMOPLASTIC LINES, BASED ON THEIR ADDED BRIGHTNESS AND VISIBILITY. THE PLOWABLE RAISED PAVEMENT MARKER, WHICH ALLOWS A MARKER SYSTEM TO BE USED IN SNOW AREAS, HAS A RUGGED STEEL HOUSING, TAPERED PLANES ON THE TOP SURFACE, A SAW-TOOTHED KEEL, AND IS EASILY INSTALLED. OHIO IS INSTALLING THESE MARKERS IN APPROXIMATELY 3000 HIGH-RISK LOCATIONS THROUGHOUT THE STATE. DUE TO THEIR HIGH COST THE REFLECTIVE MARKERS ARE NOT EXPECTED TO REPLACE ALL PAINTED LINES IN THE NEAR FUTURE. HIGH SPEED (18 MPH) APPLICATION METHODS HAVE BEEN DEVELOPED FOR PAINTED LINES, ALTHOUGH DURABILITY IS OFTEN SACRIFICED FOR MORE RAPID DRYING. HOT-SPRAYED AND HOT-EXTRUDED THERMOPLASTIC STRIPING MATERIALS DRY FASTER AND LAST LONGER THAN STANDARD TRAFFIC PAINT. POLYESTER MATERIALS ARE CURRENTLY BEING TESTED FOR FUTURE APPLICATION.

by THOMAS B. CULP
Publ: TRANSPORTATION ENGINEERING V48 N2 P18-20 (FEB 1978)
1978
Availability: SEE PUBLICATION

HS-022 460

SAFETY BENEFITS FROM THE CATEGORICAL SAFETY PROGRAMS

SAFETY BENEFITS ARE DESCRIBED WHICH HAVE BEEN REALIZED FROM IMPLEMENTATION OF SPECIFIC HIGHWAY SAFETY IMPROVEMENTS AND THE CATEGORICAL HIGHWAY SAFETY FUNDING PROGRAMS ADMINISTERED BY THE FEDERAL HWY. ADMINISTRATION. THESE PROGRAMS ARE CURRENTLY BEING CONSIDERED BY CONGRESS TO HELP DETERMINE THE FUTURE DIRECTION OF THE FEDERAL HWY. SAFETY PROG. NATIONAL HIGHWAY STATISTICS SHOW A CONSISTENT DOWNWARD TREND IN THE FATAL ACCIDENT RATE SINCE 1925; THIS TREND CAN BE CORRELATED WITH DEVELOPMENTS AND CHANGES IN FEDERAL REGULATION AND POPULATION. THE FEDERAL-AID SECONDARY SYSTEM OF HIGHWAYS UNDER LOCAL CONTROL HAS A HIGHER FATALITY ACCIDENT RATE THAN THAT UNDER STATE CONTROL, PROBABLY DUE TO DESIGN FEATURES ASSOCIATED WITH THE DIFFERENT SYSTEMS. THE COST PER FATALITY FORESTALLED FOR TEN TOP HIGHWAY COUNTERMEASURES IS COMPUTED AS $77,600 WHILE THE COST PER FATALITY FORESTALLED FOR ALCOHOL SAFETY ACTION COUNTERMEASURES IS $164,000. OF FIVE HIGHWAY SAFETY IMPROVEMENT PROGRAMS ENACTED BY CONGRESS IN THE 1973 HWY. SAFETY ACT, THE ROADSIDE OBSTACLE PROG. WAS THE MOST EFFECTIVE, AT A COST OF $37,000 PER FATAL ACCIDENT ELIMINATED. OTHER PROGRAMS WERE SAFER ROADS DEMONSTRATION; RAIL-HIGHWAY CROSSINGS; PAVEMENT MARKING DEMONSTRATION; AND HIGH-HAZARD LOCATIONS. FOR 23 IMPROVEMENTS EVALUATED, THE LESS EXPENSIVE SAFETY IMPROVEMENTS HAVE THE HIGHER BENEFIT/COST RATIO WHILE THE MORE EXPENSIVE IMPROVEMENTS ACCOUNT FOR A GREATER PERCENT REDUCTION OF ACCIDENTS.

by THOMAS A. HALL
Publ: TRANSPORTATION ENGINEERING V48 N2 P21-4 (FEB 1978)
1978
Availability: SEE PUBLICATION

HS-022 461

WILL THE REACTION OF THE AUTO TRANSPORTATION SYSTEM TO THE ENERGY CRISIS BE TECHNOLOGICAL OR INSTITUTIONAL?

OIL USE HAS BECOME A HIGHLY CHARGED POLITICAL ISSUE; WITH TRANSPORT BEING THE MAJOR CONSUMER OF OIL THE AUTO TRANSPORTATION SYSTEM IS EXPECTED TO RESPOND TO THE ENERGY CRISIS. MASS TRANSPORTATION HAS NOT EXPANDED IN RESPONSE TO THE ENERGY CRISIS, AND THE AUTOMOBILE CURRENTLY ACCOUNTS FOR 90% OF ALL PERSONAL TRAVEL. GOVERNMENT FUEL ECONOMY STANDARDS HAVE BEEN REVISED IN RESPONSE TO THE RISING COST OF PETROLEUM, WITH FUEL ECONOMY SCHEDULES THROUGH 1984. UNDER THE FUEL ECONOMY TARGETS IT IS PROJECTED THAT THE U.S. WILL PROBABLY SAVE 600,000 BARRELS OF OIL A DAY FROM PASSENGER CARS BY 1985. MOTOR VEHICLE INDUSTRY STRATEGIES INCLUDE DOWNSIZING; MATERIAL SUBSTITUTION; ENGINE AND TRANSMISSION IMPROVEMENTS; AND INCREASED DEVELOPMENT OF DIESEL ENGINES. THE EFFECT OF MANDATORY FUEL ECONOMY STANDARDS ON FUEL USAGE IS UNCERTAIN AS AUTOMOBILE TRAVEL CONTINUES TO INCREASE. INSTITUTIONAL FACTORS THAT MAY PRODUCE MAJOR CHANGES IN THE AUTOMOBILE SYSTEM OVER THE NEXT DECADE ARE: STABILIZATION OF HIGHWAY CAPACITY DUE TO SHIFT IN HIGHWAY PROGRAMS AWAY FROM NEW CONSTRUCTION; DECLINE OF POLITICAL SUPPORT FOR MASS TRANSIT; AND CONFLICTING FUEL EFFICIENCY STRATEGIES DEVELOPED FOR TRUCKS VERSUS AUTOMOBILES. PRIVATELY OWNED VEHICLES WILL INCREASINGLY BE CALLED ON TO SERVE COMMUTER, NEIGHBORHOOD AND RURAL TRANSPORTATION NEEDS VIA COMMUTER SERVICES SUCH AS CARPOOLS; CASUAL CARRIAGE; AND THE VOLUNTEER CONCEPT. THIS WILL REQUIRE REEVALUATION OF INSURANCE AND LIABILITY AND DEVELOPMENT OF EFFECTIVE RISK MANAGEMENT PROGRAMS. RENTAL AND CHARTERING OF LARGER VEHICLES IS EXPECTED TO INCREASE. THE ROLE OF GOVERNMENT IS EXPECTED TO SHIFT TO THAT OF MANAGER AND FACILITATOR OF SCHEMES TO IMPROVE VEHICLE AND HIGHW

EFFICIENCY RATHER THAN THAT OF PLANNER AND BUILDER.

by FRANK W. DAVIS, JR.; LAWRENCE F. CUNNINGHAM
Publ: TRANSPORTATION ENGINEERING V48 N2 P26-31 (FEB 1978)
1978; 23REFS
Availability: SEE PUBLICATION

HS-022 462

AN EVALUATION OF THE HIGHWAY SAFETY PROGRAM

SUMMARY IS MADE OF THE FINDINGS AND RECOMMENDATIONS CONTAINED IN A REPORT ENTITLED "AN EVALUATION OF THE HIGHWAY SAFETY PROGRAM" SUBMITTED TO CONGRESS IN JUL 1977. THE DEPT. OF TRANSPORTATION'S (DOT) LEGISLATIVE PROPOSALS FOR THE STATE AND COMMUNITY HWY. SAFETY GRANT PROG., NOW BEFORE CONGRESS, ARE DESIGNED TO CARRY OUT THE REPORT'S RECOMMENDATIONS. THE HWY. SAFETY PROG. WAS INSTITUTED IN 1966. SINCE THEN THE NATIONAL HIGHWAY FATALITY RATE HAS DECREASED BY ALMOST HALF, BUT THE OVERALL IMPACT OF THE PROGRAM IS UNCERTAIN. THE REPORT'S PRINCIPAL RECOMMENDATION IS THAT THE PRESCRIPTIVE APPROACH UNDER WHICH THE STATE AND COMMUNITY HWY. SAFETY PROG. HAS OPERATED MUST BE REPLACED BY A MORE FLEXIBLE APPROACH PLACING GREATER RELIANCE ON THE PROVEN CAPABILITIES OF STATE AND LOCAL DECISIONMAKERS. THUS A BALANCE BETWEEN NEED FOR MORE MANAGEMENT FLEXIBILITY AND NEED FOR NATIONAL UNIFORMITY MUST BE ESTABLISHED. DOT RECOMMENDS THAT MANDATORY COMPLIANCE WITH EACH OF THE PRESENT 18 HWY. SAFETY PROG. STANDARDS NO LONGER BE REQUIRED. NATIONAL UNIFORMITY SHOULD BE REQUIRED IN SIX CRITICAL AREAS: RULES OF THE ROAD; DRIVER LICENSING; VEHICLE REGISTRATION AND TITLING; TRAFFIC CONTROL DEVICES; HIGHWAY DESIGN; AND TRAFFIC RECORD SYSTEMS, WITH THE REMAINING STANDARDS SERVING AS GUIDELINES FOR THE STATES. FEDERAL STANDARDS ARE JUDGED TO BE GENERALLY ADEQUATE, AND HAVE BEEN WIDELY IMPLEMENTED. DOT RECOMMENDS THAT SANCTIONS BE REDUCED AND INCENTIVE GRANT PROGRAMS BE MODIFIED. STATE HIGHWAY SAFETY AGENCIES SHOULD TAKE EXPANDED RESPONSIBILITY IN COORDINATING STATEWIDE ACTIVITIES, WITH MORE FUNDING AT LOCAL LEVELS.

Publ: TRANSPORTATION ENGINEERING V48 N2 P39-43 (FEB 1978)
1978
Availability: SEE PUBLICATION

HS-022 463

LATERAL TIRE FORCES ON WET ROADS

EXPRESSIONS ARE DERIVED FOR SIDE FORCE AND SELF-ALIGNING TORQUE OF A SIMPLE TIRE MODEL ON WET ROADS WITH VELOCITY-DEPENDENT FRICTION. RESULTS AGREE QUALITATIVELY WITH EXPERIMENTAL RESULTS AT MODERATE SPEEDS ON WET TRACKS. IN PARTICULAR, THE THEORY CORRECTLY PREDICTS THAT THE SELF-ALIGNING TORQUE CAN BECOME NEGATIVE WHEN LATERAL TRACTIONS ARE CENTERED IN THE FRONT HALF OF THE CONTACT AREA. THERE IS VIRTUAL ADHESION IN THE FRONT PART OF THE CONTACT BECAUSE THE SLIDING TIME BEFORE MAXIMUM FRICTION IS ATTAINED IS VERY SHORT. THE PEAK OF THE TRACTIONS EVENTUALLY MOVES INTO THE FRONT HALF OF THE CONTACT AS A MODERATE SLIP ANGLE. THE SLIP ANGLE AT WHICH THE TORQUE REVERSES SIGN SHOULD INCREASE WITH THE NORMAL LOAD. A VELOCITY-DEPENDENT FRICTION COEFFICIENT IS INTRODUCED AS ESTABLISHED BY LAB EXPERIMENTS WHICH GIVE FRICTION MAXIMA AT VELOCITIES DEPENDING ON RUBBER AND TRACK BUT NOT EXCEEDING ABOUT 1 CM PER SECOND. THE TIRE MODEL USED IN THE CALCULATIONS IS A TOOTHED WHEEL WHOSE TEETH CAN DEFORM INDEPENDENTLY OF THEIR NEIGHBORS, THEIR LATERAL DEFLECTION FOLLOWING A HOOKEAN STRESS STRAIN LAW. A WATER WEDGE FORMS IN THE CONTACT AT HIGHER SPEEDS BECAUSE OF HYDRODYNAMIC FORCES SO THAT ALL TRACTIONS FINALLY ORIGINATE IN THE REAR PART OF THE CONTACT. IT IS NOT TO BE EXPECTED THAT SELF-ALIGNING TORQUE EVER BECOMES NEGATIVE UNDER THOSE CONDITIONS.

by ADOLF SCHALLAMACH
Publ: TIRE SCIENCE AND TECHNOLOGY V5 N2 P75-82 (MAY 1977)
1977; 6REFS
Availability: SEE PUBLICATION

HS-022 464

GEOMETRICS, WATER TREATMENT, UTILITY PRACTICES, SAFETY APPURTENANCES, AND OUTDOOR ADVERTISEMENT [HIGHWAY ENVIRONMENT]

A COMPILATION OF PAPERS IS PRESENTED ON VARIOUS ASPECTS OF GEOMETRICS, WATER TREATMENT, UTILITY PRACTICES, SAFETY APPURTENANCES, AND OUTDOOR ADVERTISEMENT IN RELATIONSHIP TO THE HIGHWAY ENVIRONMENT. TOPICS CONSIDERED INCLUDE THE FOLLOWING: ASPECTS OF SPIRAL TRANSITION CURVE DESIGN, NEW CONCEPTS IN DESIGN-SPEED APPLICATION, COMMUNICATION ASPECTS IN HIGHWAY DESIGN, CHARACTERISTICS OF TRUCKS OPERATING ON GRADES, REST-AREA WASTEWATER TREATMENT, EVALUATION OF A WATER-REUSE CONCEPT FOR HIGHWAY REST AREAS, AND SIMPLIFIED METHOD FOR DESIGNING CURB-OPENING INLETS. OTHER TOPICS INCLUDE THE FOLLOWING: DEVELOPMENT AND FIELD TESTING OF A NEW LOCATOR FOR BURIED PLASTIC AND METAL UTILITY LINES, DESIGN PROCEDURE FOR UNCASED NATURAL-GAS PIPELINE CROSSINGS OF ROADS AND HIGHWAYS, COORDINATING UTILITY RELOCATION AS A FUNCTION OF STATE HIGHWAY AGENCIES, STANDARD COLOR MARKINGS FOR UNDERGROUND FACILITIES, COMPUTERIZED MAPPING AND RECORD SYSTEMS FOR UTILITIES, ELIMIN

ING VEHICLE ROLLOVERS ON TURNED-DOWN GUARDRAIL TERMINALS, DESIGN OF BARREL TRAILER FOR MAXIMUM COLLISION PROTECTION, UPGRADING SAFETY PERFORMANCE BY RETROFITTING BRIDGE-RAILING SYSTEMS, EVALUATION OF CONCRETE SAFETY SHAPES BY CRASH TESTS WITH HEAVY VEHICLES, AND CONTROL OF OUTDOOR ADVERTISING IN GEORGIA.

by FRANCES R. ZWANZIG, ED.
NATIONAL ACAD. OF SCIENCES, TRANSPORTATION RES. BOARD, 2101 CONSTITUTION AVE., N.W., WASHINGTON, D.C. 20418
Rept. No. TRR-631; 1977; 102P REFS
INCLUDES HS-022 465--HS-022 470.
Availability: CORPORATE AUTHOR $4.00

HS-022 465

NEW CONCEPTS IN DESIGN-SPEED APPLICATION [HIGHWAYS]

THE PRINCIPLE USED IN THE UPDATED DESIGN-SPEED APPROACH IS THE 15-KM/H (10-MPH) RULE, WHICH DURING PERIODS OF FREE-FLOW CONDITIONS, ENTAILS THE FOLLOWING THREE CONSIDERATIONS: AVOIDING DESIGN-SPEED REDUCTIONS ALONG THE HIGHWAY EXCEPT WHERE THE ENVIRONMENT NATURALLY AND LOGICALLY ALLOWS FOR THEM AND MAINTAINING THESE REDUCTIONS AT OR BELOW 15 KM/H; MAINTAINING POTENTIAL AUTOMOBILE SPEEDS ALONG THE HIGHWAY WITHIN A GIVEN DESIGN SPEED THAT SHOULD NOT VARY MORE THAN 15 KM/H; AND MAINTAINING POTENTIAL TRUCK SPEEDS AT A VALUE NO MORE THAN 15 KM/H LOWER THAN AUTOMOBILE SPEEDS ON COMMON LANES. THE DESIGN-SPEED CONCEPT, AS PRESENTLY APPLIED, DOES NOT PRECLUDE INCONSISTENCIES IN HIGHWAY ALIGNMENT. THE BASIC PROBLEM, PARTICULARLY IN THE RANGE OF DESIGN SPEEDS BELOW 90 KM/H (55 MPH), IS THE TENDENCY ON THE PART OF THE DRIVER CONTINUALLY TO ACCELERATE AND DECELERATE; A SECONDARY PROBLEM IS THE SPEED DIFFERENTIAL BETWEEN AUTOMOBILES AND TRUCKS. THE USE OF THE NEW DESIGN-SPEED CONCEPT REQUIRES THE APPLICATION OF A SPECIAL TOOL, THE PLOTTING OF A SPEED PROFILE. THE POTENTIAL AUTOMOBILE AND TRUCK SPEEDS ARE PLOTTED ALONG THE PROPOSED HIGHWAY IMPROVEMENT, WITH SEPARATE PLOTS FOR EACH DIRECTION, TAKING INTO ACCOUNT THE JOINT CONFIGURATIONS OF THE HORIZONTAL AND VERTICAL ALIGNMENTS AND THE INDIVIDUAL CURVATURES AND GRADIENTS. A COMPLETE PROCEDURE FOR THE DEVELOPMENT OF SPEED PROFILES FOR FREE-FLOW CONDITIONS IS APPLICABLE TO DESIGNING NEW FACILITIES, BUT IS EVEN MORE USEFUL FOR DETERMINING CORRECTIVE MEASURES TO UPGRADE EXISTING FACILITIES.

by JACK E. LEISCH; JOEL P. LEISCH
JACK E. LEISCH AND ASSOCIATES, EVANSTON, ILL.
Publ: HS-022 464 (TRR-631), "GEOMETRICS, WATER TREATMENT, UTILITY PRACTICES, SAFETY APPURTENANCES, AND OUTDOOR ADVERTISEMENT," WASHINGTON, D.C., 1977 P4-14
1977; 15REFS
Availability: IN HS-022 464

HS-022 466

COMMUNICATIVE ASPECTS IN HIGHWAY DESIGN

NUMEROUS GEOMETRIC AND CONTROL FEATURES FOR INCORPORATION IN HIGHWAY DESIGN HAVE BEEN FORMULATED IN RESPONSE TO HUMAN-FACTORS INPUTS: DESIGN-SPEED APPLICATION, ALIGNMENT DESIGN AND COORDINATION, SIGHT DISTANCE, CROSS-SECTIONAL DELINEATION, OPERATIONAL UNIFORMITY AND INTERCHANGE DESIGN, LANE BALANCE, ROUTE CONTINUITY AND DESIGNATION, MARKING AND SIGNING AND THE WAY IN WHICH THEY ARE RELATED TO COMMUNICATIVE ASPECTS THE MESSAGES CONVEYED BY THE FACILITY. THE SUGGESTED GUIDELINES PERMIT IMMEDIATE APPLICATION AND ARE A STARTING POINT FOR IMPROVING DESIGN CRITERIA ON A LARGER SCALE. THEY COULD SIGNIFICANTLY IMPROVE THE OPERATIONAL EFFICIENCY AND SAFETY ON BOTH EXISTING AND NEW FACILITIES, BUT THE DESIGNER'S INPUT (PHILOSOPHY AND SKILL) MUST PLAY AN IMPORTANT ROLE IN MEETING THE OBJECTIVE OF ACHIEVING OPTIMUM DESIGN.

by JACK E. LEISCH
JACK E. LEISCH AND ASSOCIATES, EVANSTON, ILL.
Publ: HS-022 464 (TRR-631), "GEOMETRICS, WATER TREATMENT, UTILITY PRACTICES, SAFETY APPURTENANCES, AND OUTDOOR ADVERTISEMENT," WASHINGTON, D.C., 1977 P15-23
1977; 12REFS
Availability: IN HS-022 464

HS-022 467

ELIMINATING VEHICLE ROLLOVERS ON TURNED-DOWN GUARDRAIL TERMINALS

A RELATIVELY SIMPLE METHOD HAS BEEN FOUND TO MODIFY THE TURNED-DOWN ENDS OF HIGHWAY GUARDRAILS TO ELIMINATE OR MINIMIZE THE PROBABILITY THAT A VEHICLE IMPACTING THEM WILL RAMP AND ROLL OVER. TO MODIFY THE STANDARD GUARDRAIL, THE 5/8-INCH DIAMETER BOLTS ARE REMOVED FROM THE FIRST FIVE POSTS. WITH THESE BOLTS REMOVED, THE RAIL WILL DROP TO THE GROUND IF THE TURNED-DOWN TERMINAL SECTION IS STRUCK BY A VEHICLE, WHICH ELIMINATES RAMPING OF THE VEHICLE. TO HOLD THE RAIL AT ITS PROPER HEIGHT (69 CM OR 27 INCHES IN TEXAS) BEFORE AND DURING A VEHICLE IMPACT ALONG THE LENGTH OF NEED, BACK-UP PLATES ARE BOLTED TO THE FIRST FIVE POSTS. THE ACTION OF THIS MODIFIED GUARDRAIL TERMINAL IS SIMPLE: WHEN A VEHICLE TIRE OR BUMPER PUSHES DOWN ON THE TURNED-DOWN TERMINAL, THE RAIL DROPS FROM THE FIRST FIVE POSTS, WHICH ALLOWS THE VEHICLE TO PASS OVER THE RAIL. IF THE VEHICLE BUMPER IMPACTS THE RAIL ON THE LENGTH OF NEED AND PUSHES IT LATERALLY AGAINST THE BACK-UP PLATES ON THE POSTS, THE RAIL IS HELD AT ITS PROPER HEIGHT AND THE VEHICLE IS REDIRECTED. THE TEST PROGRAM INCLUDED THE FOUR CRASH TESTS FOR LONGITUDINAL BARRIER TERMINALS. ALL OF THE

TESTS WERE SUCCESSFUL, AND NO VEHICLES ROLLED OVER.

by T. J. HIRSCH; C. E. BUTH; JOHN F. NIXON; DAVID HUSTACE; HAROLD COONER
TEXAS TRANSPORTATION INST.; TEXAS STATE DEPT. OF HIGHWAYS AND PUBLIC TRANSPORTATION
Publ: HS-022 464 (TRR-631), "GEOMETRICS, WATER TREATMENT, UTILITY PRACTICES, SAFETY APPURTENANCES, AND OUTDOOR ADVERTISEMENT," WASHINGTON, D.C. 1977 P68-76 1977; 4REFS
Availability: IN HS-022 464

HS-022 468

DESIGN OF BARREL TRAILER FOR MAXIMUM COLLISION PROTECTION

A TEXAS-TYPE, STEEL-BARREL PROTECTIVE TRAILER FOR ATTACHMENT TO A SIGN TRUCK USED DURING HIGHWAY MAINTENANCE OPERATIONS HAS BEEN DEVELOPED BY THE HWY. WAYSIDE-EQUIPMENT RES. OFFICE AND THE EQUIPMENT OFFICE OF THE ONTARIO MINISTRY OF TRANSPORTATION AND COMMUNICATIONS, CANADA. WHEN ATTACHED TO A SIGN TRUCK, THE TRAILER PROVIDES MAXIMUM CRASH PROTECTION FOR OCCUPANTS OF IMPACTING AUTOMOBILES IN REAR COLLISIONS AT IMPACT SPEEDS OF UP TO 100 KM/H (60 MPH). THIS MEANS THAT RESTRAINED OCCUPANTS WILL SURVIVE SUCH COLLISIONS WITHOUT SERIOUS INJURIES. (CRASH PROTECTION IS EXPECTED TO BE SOMEWHAT LESS FOR ANGULAR IMPACTS.) THE TRAILER CAN BE TOWED AT TRAVELING SPEED AND BACKED UP AT SLOW SPEED ON A CLOSED TRAFFIC LANE. FOR FULL PROTECTION OF A WORKING CREW, THE TRAILER SHOULD BE ATTACHED TO THE KIND OF HEAVY SIGN TRUCK THAT IS PRESENTLY USED IN MAINTENANCE OPERATIONS. ALTHOUGH THE TRAILER IS AN EXTRA PIECE OF EQUIPMENT AND REQUIRES SPECIAL DRIVER SKILL IN BACKING, IT IS RECOMMENDED FOR USE ON HIGH-SPEED HIGHWAYS WITH HIGH TRAFFIC VOLUMES, EXPRESSWAYS, OR FREEWAYS. THE TRAILER REDUCES IMPACT SEVERITY CONSIDERABLY AND IS MORE EFFECTIVE THAN NONTRAILER ATTACHMENTS AT IMPACT SPEEDS OF 80 KM/H (50 MPH) OR LESS. THE FIRST PROTOTYPE TRIED ON THE ROAD HAS BEEN INVOLVED IN TWO COLLISIONS. IN BOTH INSTANCES, THE IMPACT ATTENUATION AND REDIRECTIONAL CAPABILITIES OF THE STEEL BARRELS WERE SUFFICIENT TO PREVENT INJURIES. THE CONNECTIONS BETWEEN THE BARREL MODULES, WHICH WERE ORIGINALLY WELDED, NOW CONSIST OF BOLTS AND HARD RUBBER SPACERS AND ARE STILL BEING DEVELOPED.

by F. W. JUNG
CANADA MINISTRY OF TRANSPORTATION AND COMMUNICATIONS, RES. AND DEVEL. DIV., ONT., CANADA
Publ: HS-022 464 (TRR-631), "GEOMETRICS, WATER TREATMENT, UTILITY PRACTICES, SAFETY APPURTENANCES, AND OUTDOOR ADVERTISEMENT," WASHINGTON, D.C., 1977 P76-81
1977; 8REFS

HS-022 469

UPGRADING SAFETY PERFORMANCE BY RETROFITTING BRIDGE-RAILING SYSTEMS

SUBSTANDARD BRIDGE-RAILING SYSTEMS CAN BE UPGRADED WITH COST-EFFECTIVE DEVICES WHICH CAN BE EASILY RETROFITTED TO EXISTING BRIDGES. THE INADEQUATE PERFORMANCE OF MANY CURRENT BRIDGE-RAILING SYSTEMS (APPROACH GUARDRAIL, THE TRANSITION, AND RAILING ITSELF) IN VEHICLE COLLISIONS HAS RESULTED IN A LARGE NUMBER OF INJURIES AND FATAL ACCIDENTS. AN ANALYSIS OF REPRESENTATIVE BRIDGE-RAILING DESIGNS SUBMITTED BY 44 HIGHWAY AGENCIES IN 1974 SHOWED THAT MOST DID NOT FULLY CONFORM TO THE 1973 AMERICAN ASSOC. OF STATE HWY. OFFICIALS (AASHO) SPECIFICATIONS. MOST OF THESE BRIDGE-RAILING SYSTEMS HAVE BEEN IN SERVICE FOR MORE THAN TEN YEARS AND WERE DESIGNED TO LESS RESTRICTIVE REQUIREMENTS. AN ALTERNATIVE TO REPLACING INADEQUATE INSTALLATIONS WITH CONFORMING SYSTEMS IS TO UPGRADE THE EXISTING INSTALLATION WITH A MODIFICATION OR RETROFIT DESIGN. TO REDUCE THE NUMBER OF POTENTIAL RETROFIT DESIGNS (IN VIEW OF THE ESTIMATED MORE THAN 200 UNIQUE BRIDGE-RAILING DESIGNS IN USE ON THE APPROXIMATELY ONE HALF MILLION BRIDGES IN THE U.S.), EXISTING BRIDGE-RAILING SYSTEMS CAN BE GROUPED INTO THE FOLLOWING FOUR CATEGORIES ACCORDING TO THEIR PROFILE GEOMETRICS AND FEATURES: METAL RAIL AND METAL POSTS MOUNTED FLUSH TO BRIDGE DECK, WITH CURB OR WALK (IF PRESENT) NOT PROJECTING MORE THAN 0.15 M (16 IN) ABOVE BRIDGE DECK (I); CONCRETE BALUSTER RAIL OR CONCRETE PARAPET WITH UP TO FOUR METAL RAILS, AND NO CURB OR WALK PROJECTING INTO TRAFFIC LANE BEYOND FACE OF RAIL (II) CONCRETE PARAPET WITH WALK LESS THAN 0.61 M (24 IN) WIDE AND CURB, AND WITH ONE TO THREE METAL RAILS ATTACHED TO PARAPET (IIIN) OR CONCRETE PARAPET WITH WALK 0.61 M OR MORE WIDE AND CURB, AND WITH ONE TO THREE METAL RAILS ATTACHED ON TOP OF PARAPET (IIIW); AND CONCRETE SAFETY SHAPE WITH OR WITHOUT ONE OR TWO METAL RAILS (IV). EACH CATEGORY HAS ITS OWN RESTRAINTS FOR RETROFIT MODIFICATION (I.E. CURBS, PARAPETS, ETC.), BUT A PROPERLY CONCEIVED RETROFIT DESIGN FOR A CATEGORY CAN BE ADAPTED TO ANY BRIDGE-RAILING SYSTEM IN THAT CATEGORY. ABOUT 82% OF THE EXISTING SYSTEMS REPORTED IN THE SURVEY CAN BE PLACED IN CATEGORIES II AND III. FIVE RETROFIT DESIGNS FOR THESE CATEGORIES WERE DEVELOPED AND EVALUATED BY A 22-VEHICLE CRASH-TEST PROGRAM. THESE FIVE DESIGNS ARE JUDGED SUITABLE FOR CAREFULLY MONITORED IN-SERVICE USE TO UPGRADE THE SAFETY PERFORMANCE OF SUBSTANDARD SYSTEMS.

by E. O. WILES; C. E. KIMBALL; J. D. MICHIE
SOUTHWEST RES. INST., SAN ANTONIO, TEX.
Publ: HS-022 464 (TRR-631), "GEOMETRICS, WATER TREATMENT, UTILITY PRACTICES, SAFETY

APPURTENANCES, AND OUTDOOR ADVERTISEMENT," WASHINGTON, D.C., 1977 P82-7 1977; 5REFS
SPONSORED BY FEDERAL HWY. ADMINISTRATION.
Availability: IN HS-022 464

HS-022 470

EVALUATION OF CONCRETE SAFETY SHAPES BY CRASH TESTS WITH HEAVY VEHICLES

THREE CRASH TESTS WERE CONDUCTED TO EVALUATE CONCRETE MEDIAN BARRIERS (CMB) AT SPEEDS OF APPROXIMATELY 70 AND 90 KM/H (45 AND 55 MPH) AND ANGLES OF APPROXIMATELY 7° AND 16° WITH AN 18,000 KG (40,000 LB) INTERCITY BUS. THE 61.0-M (200-FT) LONG INSTALLATION WAS CAST IN PLACE AND REINFORCED WITH ONE NUMBER FOUR BAR PLACED 150 MM (6 IN) BELOW THE BARRIER TOP. THE FREESTANDING BARRIER WAS RESTRAINED BY A 25-MM (1 IN) LAYER OF ASPHALT PLACED AT THE INSTALLATION BOTTOM ON THE SIDE OPPOSITE THE IMPACT. THE TEST RESULTS SHOW THAT THE SAFETY SHAPE PERFORMED WELL AT THE LOWER ANGLE IMPACTS WITH NO BARRIER DISTRESS OR TRANSLATION. THE SEVERE TEST (AN IMPACT SPEED OF 85.1 KM/H (52.9 MPH) AND AN IMPACT ANGLE OF 16°) SHOWED THAT THE CONCRETE SAFETY SHAPE WITH MINIMUM REINFORCEMENT AND FOUNDATION RESTRAINT CAN REDIRECT LARGE VEHICLES AT HIGH IMPACT SPEEDS AND ANGLES. IN THE SEVERE TEST, THE REAR-END IMPACT DURING REDIRECTION WAS THE PRINCIPAL CAUSE OF THE EXTENSIVE BARRIER DAMAGE AND DISPLACEMENT.

by E. O. WILES; M. E. BRONSTAD; C. E. KIMBALL
SOUTHWEST RES. INST., SAN ANTONIO, TEX.
Publ: HS-022 464 (TRR-631), "GEOMETRICS, WATER TREATMENT, UTILITY PRACTICES, SAFETY APPURTENANCES, AND OUTDOOR ADVERTISEMENT," WASHINGTON, D.C. 1977 P87-91 1977; 4REFS
Availability: IN HS-022 464

HS-022 472

ANALYSIS OF CARGO TANK INTEGRITY IN ROLLOVERS. FINAL REPORT

A RESEARCH PROGRAM WAS CONDUCTED TO ASSESS ACCIDENT DATA RELATING TO CARGO TANK OVERTURNS AND TO DETERMINE WHETHER THE EXISTING STRUCTURAL DESIGN SPECIFICATIONS FOR THE VARIOUS TANK TYPES (MC 331, 306, 307, AND 312) AS STATED IN THE CODE OF FEDERAL REGULATIONS, TITLE 49, PT. 178, SUBPART J, NEED TO BE REVISED. THE MAJOR SOURCES OF CARGO TANK ACCIDENT DATA WERE THE BUREAU OF MOTOR CARRIER SAFETY (BMCS), NINE STATES (ARIZONA, CALIFORNIA, FLORIDA, KENTUCKY, MICHIGAN, TEXAS, UTAH, VIRGINIA, AND WEST VIRGINIA), AND THE NATIONAL TRANSPORTATION SAFETY BOARD (NTSB). SUPPLEMENTARY DATA ON CARGO TANK DESIGN, PRODUCTION, AND USAGE WERE OBTAINED FROM THE TRUCK TRAILER MANUFACTURERS ASSOC. (TTMA), THE NATIONAL TANK TRUCK CARRIERS INC. (NTTC), THE MATERIALS TRANSPORTATION BUREAU (MTB), AND THE BUREAU OF CENSUS. FROM AN ANALYSIS OF THE DATA COLLECTED DURING THE LITERATURE SEARCH, RECOMMENDATIONS WERE PROPOSED FOR REVISIONS TO THE SPECIFICATIONS FOR THE FOUR CLASSES OF CARGO TANKS (MC 331 FOR COMPRESSED GASES, MC 306 FOR LOW VAPOR PRESSURE LIQUIDS, MC 307 FOR MODERATE VAPOR PRESSURE LIQUIDS, AND MC 312 FOR CORROSIVE LIQUIDS AND SOLIDS). IN PARTICULAR, THERE IS A NEED TO IMPROVE THE MC 306-TYPE STANDARDS TO REDUCE A HIGH FREQUENCY OF LEAKAGE IN CARGO TANK OVERTURN ACCIDENTS. UNDER A CONTRACT MODIFICATION, HORIZONTAL PIPE LOADING, VERTICAL ROOF LOADING, AND ACTUAL TIPOVER TESTS WERE CONDUCTED TO DETERMINE THE MODES OF STRUCTURAL FAILURE THAT RESULT IN CARGO LEAKAGE. FURTHER RESEARCH, INCLUDING THE COLLECTION OF DETAILED ACCIDENT DATA, AND THE CONDUCT OF ADDITIONAL OVERTURN TESTS ON REPRESENTATIVE TANKS, WAS RECOMMENDED TO PROVIDE THE DATA ON WHICH TO BASE SPECIFIC STANDARD REVISIONS.

by S. DAVIS; P. MASSER; C. CULLEY; J. EDWARDS
DYNAMIC SCIENCE, INC., 1850 W. PINNACLE PEAK RD., PHOENIX, ARIZ. 85047
DOT-FH-11-9193
Rept. No. DS-3991-77-36A; 1977; 315P REFS
REPT. FOR OCT 1976-OCT 1977.
Availability: NTIS

HS-022 473

ABANDONED AUTOMOBILE REMOVAL

TWO SOLID WASTE MANAGEMENT PILOT PROJECTS WERE INITIATED TO RECOVER AND RECYCLE SOME OF KENTUCKY'S ESTIMATED 300,000 ABANDONED AUTOMOBILES. FIFTEEN COUNTIES WERE SELECTED, AND PROJECT GOALS WERE TO ELIMINATE MANY ADVERSE HEALTH AND ENVIRONMENTAL PROBLEMS SUCH AS RODENT HARBORAGE, MOSQUITO BREEDING, SAFETY HAZARDS, AND WATER POLLUTION. TWELVE TRUCKS AND A SERIES OF TEMPORARY DRIVERS WERE USED TO COLLECT OVER 5000 ABANDONED VEHICLES. ADVANCE CONTACT WITH A COUNTY OFFICIAL WAS MADE TO ALLOW FOR DESIGNATION OF PUBLIC ORGANIZATIONS TO CONDUCT A SURVEY OF VEHICLES, ORIGINATE AND DISTRIBUTE PUBLIC INFORMATION, DEVELOP COLLECTION PROCEDURES, AND OBTAIN LEGAL RELEASES FOR PROCESSING VEHICLES AS REQUIRED. ENTHUSIASTIC COMMUNITY ORGANIZATIONS WITH COUNTYWIDE ORIENTATION WERE FOUND TO BE AN ESSENTIAL ELEMENT IN COUNTY RESIDENT COOPERATION. LOCAL SPONSORS RECEIVED ABOUT $100,000 FROM THE SALE OF THE JUNKED CARS TO RECYCLING FIRMS. ENVIRONMENTAL, PUBLIC HEALTH AND SAFETY, MONETARY, AND AESTHETIC GOALS OF THE PROJECT WERE ALL MET. NEARLY $200,000 WAS SPENT ON THE PROGRAM, BUT THE 12 TRUCKS PURCHASED WITH THOSE FUNDS HAVE AN ESTIMATED TEN-YEAR LIFE SPAN. KENTUCKY'S LEGISLATION ON JUNK CARS IS DEEMED ADEQUATE, BUT THE HIGH COST OF HAULING SCRAP METAL COMPARED WITH VIRGIN

MATERIAL IS A POWERFUL DETERRENT TO EFFECTIVE RECYCLING PROGRAMS. APPENDICES DETAIL PROJECT DEVELOPMENT, SHOW A RELEASE OF LIABILITY FORM, AND PRESENT A FINANCIAL REPORT.

KENTUCKY DEPT. FOR NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION, BUREAU OF NATURAL RESOURCE, CENTURY PLAZA, FRANKFORT, KY. 40601
L-004019-01-0
Rept. No. PB-268 327; 1977; 32P 2REFS
Availability: NTIS

HS-022 474

MICHIGAN'S EIGHTEEN-YEAR-OLD LEGAL DRINKING AGE, ITS IMPACT ON YOUTH CRASH INVOLVEMENT. VOL. 1: SUMMARY AND CONCLUSIONS

APPROPRIATE STATISTICAL DATA WERE GENERATED REGARDING THE TRAFFIC CRASH EXPERIENCE OF MICHIGAN DRIVERS FOR THE FOUR YEARS PRECEDING AND THE FOUR YEARS FOLLOWING THE REDUCTION OF THE LEGAL DRINKING AGE FROM 21 TO 18. ANALYTIC COMPUTER FILES OF MICHIGAN TRAFFIC CRASHES WERE CONSTRUCTED, CHARTS AND GRAPHS BASED ON THESE FILES WERE COMPILED, AND STATISTICAL TESTS ON THE DATA WERE PERFORMED. THE DATA SHOWED STATISTICALLY SIGNIFICANT INCREASES IN THE RATES OF ALCOHOL-RELATED CRASHES AMONG 18-YEAR-OLD TO 20-YEAR-OLD DRIVERS IMMEDIATELY FOLLOWING THE LOWERING OF THE LEGAL DRINKING AGE IN 1972. THESE INCREASES CONTINUED THROUGH 1975 AND CAN ONLY BE ATTRIBUTED TO THE CHANGE IN THE DRINKING LAW. IN ADDITION, A GRADUAL BUT STEADY TREND OF INCREASING ALCOHOL INVOLVEMENT IN TRAFFIC CRASHES AMONG ALL DRIVERS WAS NOTED. THE LEGAL DRINKING AGE IN MICHIGAN SHOULD BE RAISED BACK TO 21 OVER A THREE-YEAR PERIOD TO AVOID DISENFRANCHISING 18-YEAR-OLDS, 19-YEAR-OLDS, AND 20-YEAR-OLDS WHO CAN NOW LEGALLY DRINK. NEW RESEARCH SHOULD BE CONDUCTED TO BETTER DEFINE WHY YOUNG DRIVERS, IN PARTICULAR HAVE SO MUCH DIFFICULTY IN HANDLING ALCOHOL. COMPREHENSIVE NEW ALCOHOL ABUSE PREVENTION PROGRAMS SHOULD BE DEVELOPED WITH INITIAL EMPHASIS ON DRIVERS AGE 23 AND UNDER.

MICHIGAN DEPT. OF STATE POLICE, OFFICE OF HWY. SAFETY PLANNING
1977; 32P 1REF
VOL. 2 (APPENDICES, CONTAINING STATISTICAL DATA) IS HS-022 475.
Availability: CORPORATE AUTHOR

HS-022 475

MICHIGAN'S EIGHTEEN-YEAR-OLD LEGAL DRINKING AGE, ITS IMPACT ON YOUTH CRASH INVOLVEMENT. VOL. 2: APPENDICES

STATISTICAL INFORMATION COLLECTED AND ANALYZED REGARDING THE TRAFFIC CRASH EXPERIENCE OF MICHIGAN DRIVERS FOR THE FOUR YEARS PRECEDING AND THE FOUR YEARS FOLLOWING THE REDUCTION OF THE LEGAL DRINKING AGE FROM 21 TO 18, IS PRESENTED IN TABULAR AND GRAPHICAL FORM. TWO SEPARATE ACCIDENT DATA SETS WERE UTILIZED IN THE STUDY, THE FIRST CONSISTING OF ALL FATAL CRASHES DURING THE EIGHT-YEAR PERIOD. THE SECOND SET WAS A 20% RANDOM SAMPLE OF ALL ACCIDENTS OCCURRING, DURING THE SAME PERIOD. AGE-SPECIFIC FREQUENCIES AND RATES FOR BOTH DATA SETS ARE TABULATED, AND RATES AND FREQUENCY DISTRIBUTIONS ARE PLOTTED FOR BOTH. THE PRIMARY ANALYTIC VARIABLES FOR THE STUDY WERE YEARLY AGE-SPECIFIC PROPORTIONS (RATES) OF HAD BEEN DRINKING (HBD) ACCIDENTS AND OF THREE-FACTOR SURROGATE (3FS) ACCIDENTS FOR THE EIGHT YEARS IN QUESTION. TABULATED FREQUENCY AND RATE DATA FOR ACCIDENT CELLS BY SINGULAR AND GROUPED AGES ARE PROVIDED. IN ADDITION, GRAPHIC REPRESENTATIONS OF YEARLY RATES FOR SELECTED AGES AND AGE GROUPS ARE PLOTTED. THESE SAME AGE-SPECIFIC HBD AND 3FS RATES WERE SUBJECTED TO A PARTITIONED CHI-SQUARE ANALYSIS TO DETERMINE WHAT RATE CHANGES, IF ANY, WERE STATISTICALLY SIGNIFICANT AND UNLIKELY TO BE ATTRIBUTABLE TO CHANCE ALONE. THE PARTITIONING PROCESS PERMITTED COMPARISONS OF SINGLE YEARS AND GROUPS OF YEARS. CHI-SQUARE ANALYSIS DATA ARE TABULATED. A FINAL ANALYTICAL TECHNIQUE UTILIZED WAS AN ANALYSIS OF COHORTS. THIS PORTION OF THE STUDY TRACKED THE HBD CRASH EXPERIENCE OF AGE GROUPS OF DRIVERS FROM ONE YEAR TO THE NEXT. THE TIME SPAN INCLUDED THEIR LEGAL AGE OF ENFRANCHISEMENT, WHETHER 18, 19, 20, OR 21. DATA ON THE CHI-SQUARE ANALYSIS OF THE COHORTS ARE TABULATED.

UNIVERSITY OF MICHIGAN, HWY. SAFETY RES. INST.
1977; 74P
VOL. 1 (SUMMARY AND CONCLUSIONS) IS HS-022 474.
Availability: MICHIGAN DEPT. OF STATE POLICE, OFFICE OF HWY. SAFETY PLANNING

HS-022 476

COMPUTER SIMULATION OF THE EFFECT OF ROAD ROUGHNESS ON TIRE-PAVEMENT FORCES IN BRAKING AND CORNERING. INTERIM REPORT, SEP 1976 TO SEP 1977

BY THE USE OF COMPUTER SIMULATION, THE EFFECT OF ROAD ROUGHNESS ON TIRE-PAVEMENT FORCES IN BRAKING AND CORNERING ON A ROAD OF SKID NUMBER 50 WAS EXAMINED. IN ADDITION TO THE FORCE INFORMATION, BRAKING PERFORMANCE, MEASURED BY STOPPING DISTANCES, AND CORNERING PERFORMANCE, MEASURED BY "STABILITY FACTOR" WHICH INDICATES UNDERSTEER, WERE INVESTIGATED. VEHICLE PERFORMANCE WAS ASSESSED ON FOUR ROAD SURFACES (SMOOTH, ACTUAL RECORDED ROAD PROFILES, AND TWO PERIODIC PROFILES). TWO VEHICLES WERE SIMULATED, A 1971 DODGE CORONET PASSENGER CAR, AND A 1974 WHITE ROAD

BOSS SINGLE UNIT TRUCK (LOADED TO MAXIMUM GROSS WEIGHT). THE SIMULATION UTILIZED WAS THE HYBRID COMPUTER VEHICLE HANDLING PROGRAM (HVHP) WHICH IS A NONLINEAR REPRESENTATION OF FOUR-WHEELED VEHICLES. THE BRAKING PERFORMANCE WAS NORMALIZED BY COMPARING THE STOPPING DISTANCE IN THE PRESENCE OF ROUGHNESS TO THAT ACHIEVED ON A SMOOTH ROAD. A DECELERATION WHICH GAVE THE MINIMUM DODGE STOPPING DISTANCE ON SMOOTH ROAD WAS USED FOR ALL BRAKING RUNS. THE DODGE CAR STOPPING DISTANCE WAS FOUND TO BE A FUNCTION OF ROUGHNESS, AND INCREASES OF 6% OVER THE NORMAL SMOOTH ROAD VALUE WERE TYPICAL (WITH MAXIMUM INCREASES OF 10%). SEVERE ROUGHNESS TENDED TO CAUSE REAR-WHEEL LOCKUP WHICH RESULTED IN VEHICLE SPINOUT. THE WHITE TRUCK STOPPING DISTANCE WAS NOT SIGNIFICANTLY INCREASED BY ROUGHNESS BECAUSE THE TARGET DECELERATION WAS NOT AT THE TRUCK TIRE BRAKING LIMIT. WHEN SEVERE SINUSOIDAL ROUGHNESS WAS INTRODUCED, THE SUSPENSION NATURAL FREQUENCY MODES WERE EXCITED AND STOPPING DISTANCE WAS INCREASED BY 15%. THE CORNERING PERFORMANCE PROVED DIFFICULT TO EVALUATE QUANTITATIVELY. THE ABILITY OF THE VEHICLE TO "HOLD" CONSTANT VELOCITY TURN DID NOT APPEAR TO BE DEGRADED WITH ROUGHNESS. THE UNDERSTEER COEFFICIENT WAS FOUND TO VARY WITH ROAD ROUGHNESS, AND THEREFORE WAS USED AS A MEASURE OF VEHICLE CORNERING ABILITY. TIRE-PAVEMENT FORCES GENERATED BY THE VEHICLES TRAVERSING THE ROUGH ROADS WERE MONITORED FOR ALL BRAKING AND CORNERING RUNS. THE TWO TYPES OF MANEUVERS PERFORMED WERE 0.5 GEE BRAKING, AND CONSTANT RADIUS CORNERING (0.5 GEE FOR THE DODGE AND 0.3 GEE FOR THE WHITE). THE DATA COLLECTED WERE THE MEAN, MAXIMUM, AND MINIMUM FOR EACH WHEEL'S NORMAL FORCE, CIRCUMFERENTIAL FORCE (BRAKING), SIDE FORCES (CORNERING), AND STEER ANGLE (CORNERING). DOUBLE THE SMOOTH ROAD NORMAL FORCES WERE OBSERVED WHEN MAXIMUM ROUGHNESS WAS INTRODUCED. HOWEVER, THE MEAN FORCES THROUGHOUT THE MANEUVER REMAINED A CONSTANT, INDEPENDENT OF ROUGHNESS, WHICH MAY EXPLAIN THE LIMITED EFFECT ON BRAKING AND CORNERING PERFORMANCE.

by P. F. BOHN; H. D. DUNKLE
JOHNS HOPKINS UNIV., APPLIED PHYSICS LAB., JOHNS HOPKINS RD., LAUREL, MD. 20810
FHWA-P.O.-6-3-0068
Rept. No. FHWA-RD-77-124; BCE-T-0674; 1977; 112P 9REFS
Availability: NTIS

HS-022 477

A PROGRAM AUDIT OF DRIVER CONTROL AND DRIVER IMPROVEMENT PROGRAMS IN THE STATE OF UTAH

THE UTAH DRIVER IMPROVEMENT PROG. UNDER THE DRIVER LICENSE DIV. OF THE UTAH DEPT. OF PUBLIC SAFETY HAS THE FOLLOWING TWO OBJECTIVES: TO UPGRADE THE PERFORMANCE OF DRIVERS WHO BECOME INVOLVED IN THE DRIVER IMPROVEMENT PROG. THROUGH HEARINGS, INSTRUCTION, AND EXAMINATIONS, AND TO REGULATE THE DRIVING PRIVILEGE THROUGH THE USE OF SUSPENSIONS AND REVOCATIONS AS PROVIDED BY STATE STATUTES. THE AUDIT WAS CONDUCTED TO EVALUATE THE EFFECTIVENESS OF THE FOLLOWING FIVE ASPECTS OF THE DRIVER IMPROVEMENT PROG.: DEFENSIVE DRIVING COURSE AS A MEANS OF DRIVER IMPROVEMENT, LICENSE SUSPENSIONS AS A MEANS OF DRIVER CONTROL, LICENSE REVOCATIONS AS A MEANS OF DRIVER CONTROL, LIMITED LICENSES AS AN ALTERNATIVE TO LICENSE REVOCATIONS, AND COURT-OPERATED FIRST OFFENDER PROGRAMS USED AS AN ALTERNATIVE TO LICENSE REVOCATIONS AND LIMITED LICENSES. THE FOLLOWING ARE SOME MAJOR RECOMMENDATIONS PROPOSED AS A RESULT OF THIS PROGRAM AUDIT: CONTINUATION OF THE DRIVER LICENSE DIVISION'S POLICY OF GRANTING POINT REDUCTIONS FOR COMPLETING THE DEFENSIVE DRIVING COURSE; PASSAGE OF LEGISLATION PROVIDING GREATER INCENTIVE FOR DRIVERS TO SURRENDER LICENSES DURING SUSPENSION PERIODS AND A STUDY BY THE DRIVER LICENSE DIV. TO DETERMINE THE CAUSES FOR THE COURTS NOT OBTAINING LICENSES WHEN DRIVERS ARE CONVICTED OF REVOCABLE OFFENSES; ENACTMENT OF LEGISLATION TO CLARIFY SEVERAL ISSUES INVOLVED IN THE PROCEDURE FOR NOTIFYING A DRIVER OF HIS/HER LICENSE REVOCATION (I.E. SPECIFY THE DATE OF CONVICTION TO BE THE DATE OF REVOCATION, AND REQUIRE THE JUDGES TO PERFORM THE FUNCTION OF NOTIFYING THE DRIVER OF REVOCATION AND AT THE SAME TIME, REQUIRE THE SURRENDER OF THE LICENSE); A STUDY BY THE OFFICE OF LEGISLATIVE GENERAL COUNSEL ON THE STATUS OF THE IMPLIED CONSENT LAW AND SUBMISSION OF REPORT TO THE LEGISLATURE; A STUDY BY THE LEGISLATURE ON EXTENDING THE LIMITED DRIVING PRIVILEGE TO OTHER DRIVERS WHO RECEIVE LICENSE REVOCATIONS, BUT WHO ARE INELIGIBLE FOR SUCH PRIVILEGES UNDER PRESENT STATUTES; A REVIEW BY THE LEGISLATURE OF THE INTENT OF SECTION 77-35-17 (IN RELATION TO STATUTORY AUTHORITY FOR THE FIRST OFFENDER PROGRAM) AND RESTORATION, AS DEEMED APPROPRIATE, OF UNIFORMITY OF TREATMENT IN ALL TRAFFIC CASES; ENACTMENT OF LEGISLATION PROVIDING FOR PROPER COURT REPORTING ON FIRST OFFENDER PROGRAMS IF THE LEGISLATURE DETERMINES THAT THESE PROGRAMS SHOULD CONTINUE; AND A STUDY TO DEVELOP ALTERNATE OR ADDITIONAL TREATMENTS TO BE EMPLOYED WITH FIRST OFFENDER DRIVERS.

STATE OF UTAH, OFFICE OF THE LEGISLATIVE AUDITOR GENERAL, STATE CAPITOL BLDG., SALT LAKE CITY, UTAH 84114
Rept. No. AUDIT-76-4B; 1976; 89P
Availability: CORPORATE AUTHOR

HS-022 478

CRASH TESTS WITH PASSENGER VEHICLES] SIMULATION AND COMPUTER RECONSTRUCTION OF ACCIDENTS (CRASHVERSUCHE MIT PERSONENKRAFTWAGEN. SIMULATION UND RECHNERISCHE REKONSTRUKTION VON UNFALLEN)

CRASH TESTS WERE CONDUCTED WITH PASSENGER VEHICLES, AND IMPACT CHARACTERISTICS OF THE VEHICLES INVOLVED IN THE COLLISIONS WERE USED FOR COMPUTER RECONSTRUCTION OF THE "ACCIDENTS." THIS IS THE THIRD IN A SERIES OF RESEARCH PAPERS CONCERNING THE FORENSIC ANALYSIS OF TRAFFIC ACCIDENTS, THE RESEARCH BEING CONDUCTED BY THE BAVARIAN INDUSTRIAL MONITORING UNION AND SUPPORTED, IN PART, BY THE FEDERAL MINISTRY OF TRANSPORT. TYPICAL PROPERTIES OF DEFORMATION BEHAVIOR OF PASSENGER VEHICLES WERE DETERMINED AND EVALUATED, AND COMPUTER METHODS WERE USED TO MATHEMATICALLY INCORPORATE DEFORMATION INTO COLLISION ANALYSES.

by HELGO SCHNEIDER
TECHNISCHER UBERWACHUNGS-VEREIN BAYERN E.V., GERMANY
Rept. No. TUV-21; 1976; 130P 7REFS
TEXT ALSO IN GERMAN.
Availability: TECHTRAN CORP., P.O. BOX 729, GLEN BURNIE, MD.

HS-022 479

BASICS OF TWO-WHEEL VEHICLE TRAFFIC. PT. A: DOCUMENTED INFORMATION ON TWO-WHEEL VEHICLE TRAFFIC WITH THE EXCEPTION OF MOTORCYCLES OVER 50 CC. PT. B: POSITION ON THE REVISION OF THE NATIONAL REGULATIONS FOR LIGHTWEIGHT MOTORCYCLES AND BICYCLES WITH AUXILIARY ENGINES (GRUNDLAGEN ZUM ZWEIRADVERKEHR. TEIL A: DOKUMENTATION UBER DEN ZWEIRADVERKEHR AUSGENOMMEN KRAFTRADER UBER 50 CCM. TEIL B:STELLUNGNAHME ZU EINER ANDERUNG DER NATIONALEN VORSCHRIFTEN FUR LEINKRAFTRADER UND FAHRRADER MIT HILFSMOTOR)

A REVIEW OF INFORMATION SOURCES (IN THE FEDERAL REPUBLIC OF GERMANY) REGARDING TWO-WHEELED VEHICLE TRAFFIC IS PRESENTED, AND REVISION OF THE NATIONAL REGULATIONS FOR LIGHTWEIGHT MOTORCYCLES AND BICYCLES WITH AUXILIARY ENGINES IS DISCUSSED. DIVERSE AVAILABLE DATA ON THE FOLLOWING TYPES OF TWO-WHEELED VEHICLES ARE INCLUDED: BICYCLES, BICYCLES WITH AUXILIARY ENGINES (MOFAS, MOPEDS AND MOKICKS), AND LIGHTWEIGHT MOTORCYCLES. BESIDES INFORMATION COMPILED FROM THE LITERATURE SEARCH, OPINIONS OF AUTHORITIES IN THE FIELD ARE PRESENTED. IN RELATION TO POSSIBLE REVISIONS IN THE NATIONAL (FEDERAL REPUBLIC OF GER-

AND BICYCLES WITH AUXILIARY ENGINES, TH
FOLLOWING TOPICS ARE DISCUSSED: FRAMEWOR
OF REGULATIONS FOR LIGHTWEIGHT MOTORC
CLES AND BICYCLES WITH AUXILIARY ENGINE
TECHNICAL CHARACTERISTICS OF THE VEHICLE
THE NUMBER OF TWO-WHEELED VEHICLES ON TH
ROAD, AND THEIR INVOLVEMENT IN TRAFFIC AN
IN ACCIDENTS. A SPEED LIMIT SHOULD BE PLACE
ON THESE TWO-WHEELED VEHICLES, FOR EXAMPL
A LIMIT OF 70 KM/H. ALL VEHICLES FASTER THA
25 KM/H SHOULD UNDERGO PERIODIC INSPECTION
VEHICLE DESIGNS SHOULD BE TAMPER-PROOF I
ORDER TO PREVENT MODIFICATIONS AIMED AT I
CREASING THE POWER OUTPUT, AND OPERATOI
OF ALL TWO-WHEELED VEHICLES DESIGNED FC
SPEEDS HIGHER THAN 25 KM/H SHOULD WEA
CRASH HELMETS. LIGHTWEIGHT MOTORCYCLI
SHOULD BE OPERATED ONLY BY PERSONS WH
HAVE RECEIVED DRIVER'S LICENSES AFTER PA
TICIPATING IN A PROPER TRAINING PROGRAM.

by H. OP DE HIPT; H. LOFFELHOLZ; F. NICKLISCH
Publ: UNFALL- UND SICHERHEITSFORSCHUNG STRASSENVERKEHR N9 (1977)
1977; 245P REFS
TEXT ALSO IN GERMAN.
Availability: TECHTRAN CORP., P.O. BOX 729, GLEN BURNIE, MD.

HS-022 480

ANTHROPOMETRIC SURVEY OF TRUCK AND BU DRIVERS: ANTHROPOMETRY, CONTROL REACH AND CONTROL FORCE. FINAL REPORT

A MOBILE LAB WAS CONSTRUCTED TO COLLE ANTHROPOMETRIC DATA ON STATIC AND DYNAM ANTHROPOMETRY, REACH ENVELOPE, SLEEP E VELOPE, AND FORCE PRODUCTION TO STEERIN WHEEL AND BRAKE-CLUTCH PEDALS; DATA WE COLLECTED ON 227 TRUCK AND 50 BUS DRIVE THE SAMPLE CONSISTED OF 96% MALE AND FEMALE DRIVERS. THE MEAN AGE WAS 40.2 YEA WITH A RANGE FROM 22 TO 64 YEARS OF AGE. T MAJORITY (62.5%) OF DRIVERS WERE EMPLOYED PRIVATE TRUCK FLEETS AND MOST (54.7%) DRO LINE HAUL OPERATIONS. THERE WERE ESSE TIALLY NO DIFFERENCES BETWEEN TRUCK A BUS DRIVERS ON THE STATIC MEASURES. COMP ING THE CURRENT DATA TO DATA COLLECTED TRUCK AND BUS DRIVERS IN 1950 REVEALED TH THE CURRENT SAMPLE WAS LARGER ON ALL B TWO STATIC MEASURES (STATURE, WEIG SITTING HEIGHT, SITTING EYE HEIGHT, SITT SHOULDER HEIGHT, SITTING ELBOW HEIG SITTING THIGH CLEARANCE HEIGHT, SITTING KN HEIGHT, HEAD BACK TO EYE LENGTH, SITTING A REACH, FOREARM-HAND LENGTH, BUTTOCK-KN LENGTH, BUTTOCK-POPLITEAL LENGTH, SHOUL BREADTH, SITTING SEAT BREADTH). THE TWO CEPTIONS WERE ARM REACH (DIFFERENCE 0.5 IN AND SEAT BREADTH (DIFFERENCE 0.9 INCH). C PARED TO A GENERAL CIVILIAN POPULATION (1 COLLECTED FROM 1959 TO 1962), THE CURRENT S PLE WAS LARGER ON ALL MEASURES BUT (THIGH CLEARANCE). FOR ALL STATIC AND DYN

HEIGHT, SITTING KNEE HEIGHT, ACCELERATOR HEEL POINT (AHP) TO EYE LENGTH, AHP TO ABDOMEN LENGTH, AHP TO KNEE LENGTH, ELBOW BREADTH, KNEE BREADTH), THE MEAN, STANDARD DEVIATION, STANDARD ERROR, 5TH, 50TH, 95TH PERCENTILES, KURTOSIS AND SKEWNESS VALUES ARE PRESENTED. THE 5TH, 10TH AND 20TH PERCENTILE VALUES FOR FRONT, RIGHT SIDE, AND BEHIND THE SEAT REACH ENVELOPES ARE PRESENTED. WEARING A WINTER JACKET RESTRICTED REACH BY APPROXIMATELY TWO INCHES. MAXIMUM FORCE (TORQUE ON WHEEL) AND SUSTAINED FORCE (TORQUE) AT MAX PLUS 5, 10, 15 SECONDS ARE PRESENTED. STEERING WHEEL TORQUE IS COMPARED TO TORQUES PROVIDED DURING FRONT TIRE BLOWOUT CONDITIONS. FROM 7% TO 12% OF THE SAMPLE WOULD NOT BE ABLE TO SUSTAIN PEAK BLOWOUT TORQUES. THE 95TH, 90TH, 80TH PERCENTILES ON HEIGHT, WIDTH AND LENGTH OF SLEEP ENVELOPES ARE ALSO PRESENTED. TRUCK/BUS MANUFACTURERS SHOULD BE MADE AWARE OF THESE DATA AND ENCOURAGED TO USE THEM IN DESIGNING VEHICLE CABS. A HUMAN FACTORS EVALUATION SHOULD BE MADE OF CURRENT TRUCK/BUS DRIVER STATIONS, AND STUDIES SHOULD BE CONDUCTED TO DETERMINE WHAT CORRECTIVE ACTIONS AND TORQUES DRIVERS PRODUCE WHEN CONFRONTED WITH A SURPRISE SIMULATED FRONT TIRE BLOWOUT. SERIOUS CONSIDERATION SHOULD BE GIVEN TO INCREASING THE MINIMUM SLEEPER BERTH WIDTH REQUIREMENT.

by MARK S. SANDERS
CANYON RES. GROUP, INC., 32107 LINDERO CANYON RD., SUITE 123, WESTLAKE VILLAGE, CALIF. 91361
DOT-FH-11-8817
Rept. No. FHWA/BCMS-77-2-1; PB-273 514; 1977; 130P 11REFS
Availability: NTIS

HS-022 481

BRAKE SYSTEMS--PT. 3. HOW TO PERFORM A COMPLETE BRAKE JOB--DISCS

IN THE LAST IN A SERIES OF THREE ARTICLES ON REPAIRING AUTOMOTIVE BRAKES, PROCEDURES FOR THE REPAIR OF DISC BRAKES BY A SPECIALIST ARE PRESENTED. STEP-BY-STEP INSTRUCTIONS FOR CHECKING OUT DISC BRAKES AND MAKING REPAIRS IF NECESSARY ARE PROVIDED UNDER THE FOLLOWING CATEGORIES: VISUAL INSPECTION, ROTOR MEASUREMENTS, REMOVING CALIPERS, REMOVING ROTORS, REMOVING BRAKE PADS, ROTOR REFINISHING, CALIPER DISASSEMBLY, AND REASSEMBLING FRONT BRAKES. A CAR SHOULD BE RETURNED TO THE OWNER ONLY IF IT IS ABLE TO STOP SMOOTHLY WITHIN 25 FEET WHEN TRAVELING AT 20 MILES PER HOUR WITHOUT SWERVING OUT OF A 12-FOOT-WIDE LANE, IF IT HAS A FIRM PEDAL AND A STROKE EQUAL TO AT LEAST HALF OF THE DISTANCE BETWEEN A FREE PEDAL AND ITS 20% RESERVE, AND IF THE PARKING BRAKE HOLDS APPROXIMATELY ONE THIRD OF ITS TOTAL TRAVEL.

NATIONAL TIRE DEALERS AND RETREADERS ASSOC., TIRE SERVICE SPECIALIST COM., 1343 L ST., N.W., WASHINGTON, D.C. 20005
Publ: DEALER NEWS V41 N3 P13-20 (13-20 FEB 1978) 1978
Availability: SEE PUBLICATION

HS-022 482

FRONT AXLE LOADS AND TRUCK SAFETY

THE RELATIONSHIP OF FRONT AXLE LOADS AND TRUCK SAFETY IS DISCUSSED IN LIGHT OF THE DEPT. OF TRANSPORTATION'S INVESTIGATION OF THE MATTER IN ACCORDANCE WITH A CONGRESSIONAL DIRECTIVE INCLUDED IN SECTION 210 OF THE FEDERAL AID HWY. ACT OF 1976, AND THE BUREAU OF MOTOR CARRIER SAFETY'S (BMCS) AMENDMENT OF TIRE REGULATIONS IN OCT 1975, TO LIMIT FRONT TIRE LOADS TO THOSE SPECIFIED BY THE STANDARDIZING BODIES LISTED IN FEDERAL MOTOR VEHICLE SAFETY STANDARD (FMVSS) NO. 119. IN DEVELOPING THIS AMENDMENT, THE BMCS CONSIDERED, BUT REJECTED, A SUGGESTION THAT THE SAFETY REGULATIONS SPECIFY A MAXIMUM ALLOWABLE FRONT AXLE WEIGHT OF 12,000 POUNDS, WHICH WOULD BE THE WEIGHT ON THE FRONT AXLE OF A FIVE-AXLE TRACTOR SEMITRAILER COMBINATION IF THE TOTAL GROSS WEIGHT OF THE COMBINATION WERE TO BE 80,000 POUNDS AS ALLOWED BY THE NEW FEDERAL LIMITS. IT APPEARS QUESTIONABLE WHETHER SOLUTION OF THE PROBLEM OF FRONT TIRE FAILURES IS ONE OF LIMITING LOADS TO SOME ARBITRARY ABSOLUTE WEIGHT (E.G. 12,000 POUND). RATHER, THE SOLUTION APPEARS TO BE ONE OF HAVING ALL FRONT END COMPONENTS (AXLES, WHEELS, RIMS, TIRES, AND EVEN BRAKES) WITH STRUCTURAL INTEGRITY AND CAPACITY ADEQUATE TO SAFELY CARRY THE ACTUAL FRONT AXLE LOAD UP TO AT LEAST THE SINGLE-AXLE LOAD LIMIT. SOLUTION TO THIS PROBLEM IS ONE OF ADEQUATE ENFORCEMENT OF EXISTING LAWS AND REGULATIONS, NOT ONE OF ADDITIONAL STANDARDS. THERE IS NO REASON TO BELIEVE THAT THERE WOULD BE LESS VIOLATION OF A SPECIFIED MAXIMUM FRONT AXLE LOAD LIMIT THAN OF EXISTING CONTROLS. FURTHERMORE, AN UNDULY RESTRICTIVE FRONT AXLE LOAD LIMIT WOULD PROBABLY RESULT IN MORE VIOLATIONS.

by FRED J. MYERS
WESTERN HWY. INST., 333 PINE ST., SAN FRANCISCO, CALIF. 94104
1977; 107P 33REFS
Availability: CORPORATE AUTHOR $5.00

HS-022 483

STUDY OF IMPACT TOLERANCE THROUGH FREE-FALL INVESTIGATIONS. FINAL REPORT

A STUDY WAS UNDERTAKEN WHICH COMBINED TECHNIQUES OF DETAILED INVESTIGATION OF

SELECTED HUMAN FREE-FALL IMPACTS AND COMPUTER SIMULATION OF REPRESENTATIVE FALLS IN ORDER TO EXPAND KNOWLEDGE OF HUMAN IMPACT TOLERANCE. OF 2100 FALLS OCCURRING IN THE U.S. AND CANADA, 110 CASES WERE SELECTED FOR ON-SITE INVESTIGATION OF BIOMEDICAL AND BIOPHYSICAL FACTORS. SEVEN HEAD-FIRST, TWO SIDE-FIRST, AND THREE FEET-FIRST FALLS WERE THEN SIMULATED USING THE MVMA (MOTOR VEHICLE MANUFACTURER'S ASSOC.) 2-D CRASH VICTIM SIMULATOR. CHILDREN WERE GENERALLY INJURED LESS SEVERELY THAN ADULTS UNDER SIMILAR FALL CIRCUMSTANCES AND TENDED TO LAND ON THEIR HEADS A GREATER PROPORTION OF THE TIME. IT WAS FOUND THAT SURVIVAL LIMITS FOR CHILDREN MAY BE HIGHER THAN PREVIOUSLY BELIEVED. BODY POSITION AT IMPACT WAS A MAJOR FACTOR IN RESULTING INJURIES. IN FALLS TO RIGID SURFACES, CERTAIN TYPES OF INJURY CAN BE PREDICTED ON THE BASIS OF AGE AND FALL DISTANCE. VIRTUALLY ANY FALL FROM GREATER THAN 10 FEET (3.0 M) WITH HEAD-FIRST IMPACT MAY BE EXPECTED TO CAUSE SKULL FRACTURE FOR ADULT OR CHILD. ADULTS LANDING IN A SITTING POSITION AFTER FALLING FROM GREATER THAN 10 FEET WILL ALMOST ALWAYS INCUR LUMBAR SPINE FRACTURES, ESPECIALLY OF THE FIRST LUMBAR VERTEBRA. FEET-FIRST FALLS FROM GREATER THAN 15 FEET (4.5 M) WILL PROBABLY RESULT IN LEG AND ANKLE FRACTURES, AND IN FALLS FROM 30 FEET AND ABOVE (9.0 M), PELVIC FRACTURES ARE LIKELY TO OCCUR. FOR CHILDREN UNDER AGE EIGHT IT IS CONCLUDED THAT A CONSTANT ACCELERATION OF UP TO 350 G FOR 2.5-3 MSEC APPROACHES THE SURVIVAL LIMIT FOR HEAD IMPACTS. FOR CHILDREN YOUNGER THAN 18 MONTHS THE MINIMUM LIGHT TOLERANCE LEVEL FOR REVERSIBLE HEAD INJURY MAY BE REACHED WHEN FALL DISTANCE IS SOMEWHAT GREATER THAN FOUR FEET.

by RICHARD G. SNYDER; DAVID R. FOUST; BRUCE M. BOWMAN
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IIHS-6604
Rept. No. UM-HSRI-77-8; 1977; 312P 118REFS
REPT. FOR 15 MAY 1975-15 DEC 1977.
Availability: HSRI

HS-022 484

EVALUATION OF THE MICHIGAN TRIAL SUBSTITUTE VEHICLE INSPECTION PROGRAM. FINAL REPORT. EXECUTIVE SUMMARY

by JAIRUS D. FLORA; TERRY D. TRUAX; DAN THOLEN; RONALD L. COPP; RICHARD F. CORN
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MVI-75-001A
Rept. No. UM-HSRI-77-57-1; 1977; 27P 2REFS
REPT. FOR MAY 1975-AUG 1977. FOR ABSTRACT, SEE HS-022 485.

HS-022 485

EVALUATION OF THE MICHIGAN TRIAL SUBSTITUTE VEHICLE INSPECTION PROGRAM. FINAL REPORT

A TWO-YEAR STUDY WAS CONDUCTED TO EVALUATE THE MICHIGAN CHECKLANE INSPECTION SYSTEM AS A TRIAL SUBSTITUTE FOR A PERIODIC MOTOR VEHICLE INSPECTION (PMVI) PROGRAM. TWO MICHIGAN COUNTIES, MONROE AND JACKSON, SERVED AS THE TEST AREAS; THE FORMER HAD A CHECKLANE INSPECTION OF 15% OF THE CARS, THE LATTER HAD A SIMULATED PMVI. RANDOM CHECKLANES WERE USED IN 1975 AND 1976 TO ESTIMATE THE CONDITION OF THE CARS IN EACH COUNTY, WITH MINIMUM SAMPLE SIZES OF 2000 CARS FOR EACH STUDY GROUP. THE RATE OF EQUIPMENT OUTAGES WAS FOUND TO DEPEND STRONGLY ON THE AGE OF THE CAR. CHARTS OF THIS RELATIONSHIP ARE PRESENTED FOR SEVERAL SAFETY COMPONENTS. AFTER ADJUSTING FOR THE AGE OF THE CAR, NO SIGNIFICANT DIFFERENCES WERE FOUND IN COMPARING THE PREVIOUS 5% CHECKLANE PROGRAM TO THE MORE INTENSIVE 15% CHECKLANE PROGRAM. CARS IN THE SIMULATED PMVI PROGRAM PROVED TO BE A SELF-SELECTING SAMPLE OF NEWER CARS IN BETTER MECHANICAL CONDITION THAN AVERAGE, MAKING DIRECT COMPARISONS TO THE CHECKLANE POPULATION DIFFICULT. IN THE 1975 SAMPLE OF CARS IN THE PMVI GROUP THE EFFECTS OF THE 5% CHECKLANE INSPECTION PROGRAM WAS ESTIMATED; IN THE 1976 SAMPLE OF THESE CARS THE EFFECTS OF THE SIMULATED PMVI GROUP WAS ESTIMATED, AND THESE TWO SAMPLES DID NOT DIFFER SIGNIFICANTLY. THUS, THERE WAS NO EVIDENCE OF DIFFERENCES AMONG THE PMVI, 15% CHECKLANE, OR 5% CHECKLANE. A SPECIAL STUDY IN 1975 COMPARED A MOVING-STOPPING TEST (MST) TO A WHEEL-PULL BRAKE INSPECTION. THE CONCLUSION WAS THAT THE MST WAS MORE STRINGENT AND EASIER TO PERFORM. IN 1976, THE REPAIR RATES FOR VEHICLES IN THE PMVI GROUP WERE ALSO DETERMINED FOR SEVERAL SAFETY COMPONENTS AND ARE REPORTED.

by JAIRUS D. FLORA; TERRY D. TRUAX; DAN THOLEN; RONALD L. COPP; RICHARD F. CORN
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MVI-75-001A
Rept. No. UM-HSRI-77-57-2; 1977; 262P 107REFS
REPT. FOR MAY 1975-AUG 1977. SUMMARY REPT. IS HS-022 484.
Availability: CORPORATE AUTHOR

HS-022 486

HYBRID VEHICLE TECHNOLOGY CONSTRAINTS AND APPLICATION ASSESSMENT STUDY. FINAL REPORT. VOL. 1: SUMMARY

by D. E. LAPEDES; M. G. HINTON; L. FORREST; J. KOHLENBERGER; T. RYAN; H. SAMPSON; W. SMALLEY; C. SPEISMAN; H. WHITE
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DOT-F04701-76-C-0077
Rept. No. DOT-TSC-OST-77-23-I; 1977; 117P
REPT. FOR APR 1975-JUN 1976. FOR ABSTRACTS, SEE HS-022 487--HS-022 489.
Availability: NTIS

HS-022 487

HYBRID VEHICLE TECHNOLOGY CONSTRAINTS AND APPLICATION ASSESSMENT STUDY. FINAL REPORT. VOL. 2: SECTIONS 1 THROUGH 4

METHODS USED IN THE STUDY AND THE DATA BASE EMPLOYED IN SIMULATION MODELING OF VEHICLE POWERTRAINS ARE PRESENTED. VARIOUS HYBRID SYSTEMS DEVELOPED AND STUDIES CONDUCTED IN RECENT YEARS INCLUDE THE FOLLOWING: HYBRID HEAT ENGINE/BATTERY SYSTEMS (PETRO-ELECTRIC MOTORS PROTOTYPE HYBRID CAR; MERCEDES-BENZ HYBRID BUS; TRW HYBRID VEHICLE STUDY AND TEST; MINICARS, INC. HYBRID CAR; GENERAL MOTORS CORP. STIR-LEC I HYBRID CAR; THE AEROSPACE CORP. HYBRID VEHICLE STUDY; AND THE UNIV. OF WISCONSIN HYBRID VEHICLE STUDY); AND HYBRID HEAT ENGINE/FLYWHEEL SYSTEMS (LOCKHEED HYBRID VEHICLE STUDY; JOHNS HOPKINS UNIV. HYBRID VEHICLE STUDY; UNIV. OF WISCONSIN HYBRID AUTOMOBILE (DESIGN AND SIMULATION); AND THE TECHNICAL SCHOOL AT AACHEN, WEST GERMANY HYBRID VAN (DESIGN AND TEST)). A TECHNOLOGY REVIEW IS PROVIDED OF POWERTRAIN COMPONENTS (HEAT ENGINES, ELECTRIC MOTORS/GENERATORS/CONTROL SYSTEMS, SECONDARY BATTERIES, FLYWHEELS, TRANSMISSIONS, AND OTHER ENERGY STORAGE SYSTEMS).

by D. E. LAPEDES; M. G. HINTON; L. FORREST; J. KOHLENBERGER; T. RYAN; H. SAMPSON; W. SMALLEY; C. SPEISMAN; H. WHITE
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Rept. No. DOT-TSC-OST-77-23-II; 1977; 224P 82REFS
REPT. FOR APR 1975-JUN 1976. SUMMARY REPT. (VOL. 1) IS HS-022 486 AND VOLS. 3 AND 4 ARE HS-022 488 AND HS-022 489.
Availability: NTIS

HS-022 488

HYBRID VEHICLE TECHNOLOGY CONSTRAINTS AND APPLICATION ASSESSMENT STUDY. FINAL REPORT. VOL. 3: SECTIONS 5 THROUGH 9

IN THIS THIRD VOLUME OF A FOUR-VOLUME REPORT CONCERNED WITH AN ASSESSMENT OF HYBRID VEHICLE TECHNOLOGY AND APPLICATIONS, VEHICLE POWERTRAIN CHARACTERISTICS AND CHARACTERISTICS OF STATIONARY ELECTRIC GENERATING PLANTS ARE DISCUSSED, PHYSICAL AND PERFORMANCE CHARACTERISTICS IMPOSED ON THE HYBRID VEHICLES ARE DESCRIBED, COMPUTER PROGRAMS DEVELOPED FOR HYBRID VEHICLE SIMULATION ARE DESCRIBED, AND THE RESULTS OF A POWERTRAIN COMPONENT SIZING ANALYSIS ARE DISCUSSED. SELECTED CHARACTERISTICS FOR POWERTRAIN COMPONENTS DISCUSSED IN THIS VOLUME ARE AS FOLLOWS: HEAT ENGINE PERFORMANCE, ELECTRIC MOTOR/GENERATOR/CONTROL SYSTEM, BATTERY, FLYWHEEL, CONTINUOUSLY VARIABLE TRANSMISSION, VEHICLE ACCESSORY AND ENGINE AUXILIARY POWER REQUIREMENTS, AND GEAR SYSTEM. THE STATIONARY ELECTRIC GENERATING PLANTS ARE DISCUSSED IN TERMS OF ENERGY SOURCES, EFFICIENCY OF POWER PLANTS, AND EMISSION FACTORS.

by D. E. LAPEDES; M. G. HINTON; L. FORREST; J. KOHLENBERGER; T. RYAN; H. SAMPSON; W. SMALLEY; C. SPEISMAN; H. WHITE
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F04701-76-C-0077
Rept. No. DOT-TSC-OST-77-23-III; 1977; 188P 57REFS
REPT. FOR APR 1975-JUN 1976. SUMMARY REPT. (VOL. 1) IS HS-022 486, VOL. 2 IS HS-022 487, AND VOL. 4 IS HS-022 489.
Availability: NTIS

HS-022 489

HYBRID VEHICLE TECHNOLOGY CONSTRAINTS AND APPLICATION ASSESSMENT STUDY. FINAL REPORT. VOL. 4: SECTIONS 10, 11, AND APPENDIX

IN THE LAST VOLUME OF A FOUR-VOLUME REPORT CONCERNING AN ASSESSMENT OF HYBRID VEHICLE TECHNOLOGY AND APPLICATIONS, ENERGY CONSUMPTION AND EXHAUST EMISSIONS OF HYBRID VEHICLES ARE DISCUSSED. ENERGY CONSUMPTION AND EXHAUST EMISSIONS OF HEAT ENGINE/BATTERY-POWERED AND HEAT ENGINE/FLYWHEEL-POWERED HYBRID VEHICLES WERE SIMULATED FOR THE EPA (ENVIRONMENTAL PROTECTION AGENCY) URBAN DRIVING CYCLE, THE EPA HIGHWAY DRIVING CYCLE, AND THE U.S. POSTAL SERVICE DRIVING CYCLE. CRUISE SPEEDS, VEHICLE WEIGHTS, AND POWERTRAIN CONFIGURATIONS ARE DISCUSSED IN REGARD TO THE INTEGRATED RESULTS THAT SUMMARIZE VEHICLE-RELATED ENERGY CONSUMPTION AND EXHAUST EMISSIONS. THE OVERALL ASSESSMENT FOR HYBRID HEAT ENGINE/BATTERY VEHICLES IS THAT THEY CAN PROVIDE ENERGY SAVINGS OVER PRESENT, CONVENTIONALLY POWERED VEHICLES WHILE MEETING EXHAUST EMISSION STANDARDS. BUT THE ACHIEVEMENT OF THIS CAPABILITY REQUIRES COMPROMISES IN VEHICLE DESIGN WEIGHT, DESIGN CRUISE SPEED, AND DESIGN OPERATING RANGE. IN ADDITION, LOW-PERFORMANCE, ALL-ELECTRIC VEHICLES HAVE THE POTENTIAL TO APPROACH BEING COMPETITIVE WITH HIGH-PERFORMANCE HYBRID HEAT EN-

GINE/ELECTRIC VEHICLES IN REGARD TO OPERATING RANGE AND TO PROVIDE EVEN GREATER REDUCTIONS IN ENERGY CONSUMPTION AND EMISSIONS WHEN COMPARED WITH CONVENTIONALLY POWERED VEHICLES. THE ASSESSMENT OF HYBRID HEAT ENGINE/FLYWHEEL VEHICLES IS THAT THEY ARE CAPABLE OF SIGNIFICANT ENERGY SAVINGS OVER CONVENTIONALLY POWERED VEHICLES, PARTICULARLY FOR STOP-AND-GO DRIVING (AS OPPOSED TO HIGH-SPEED HIGHWAY DRIVING). IN URBAN DRIVING SITUATIONS THEY CAN PROVIDE MAJOR REDUCTIONS IN ENERGY CONSUMPTION WITHOUT THE DESIGN OPERATING RANGE RESTRICTIONS ASSOCIATED WITH THE HYBRID HEAT ENGINE/BATTERY VEHICLE. HOWEVER TO MEET THE FEDERAL NITROGEN OXIDES (NOX) EMISSION STANDARD, COMPROMISES MUST BE SOUGHT BETWEEN VEHICLE DESIGN CRUISE SPEED AND VEHICLE WEIGHT WITH A NECESSARY TREND TOWARD HIGHER DESIGN CRUISE SPEED COMBINED WITH LOWER VEHICLE WEIGHT. THE HEAT ENGINE/BATTERY SYSTEM MIGHT BE FAVORED AS A NEAR-TERM OPTION FOR PETROLEUM-BASED FUELS. ALL-ELECTRIC VEHICLES WOULD BE EVEN MORE STRONGLY FAVORED FOR CONSERVING THESE FUELS; BUT, BECAUSE OF THEIR PRESENT LIMITED RANGE, THE APPLICATIONS WOULD BE MUCH MORE LIMITED THAN FOR THE HYBRID VEHICLES.

by D. E. LAPEDES; M. G. HINTON; L. FORREST; J. KOHLENBERGER; T. RYAN; H. SAMPSON; W. SMALLEY; C. SPEISMAN; H. WHITE
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Availability: NTIS

:S-022 490

:ELIABILITY CONSIDERATIONS IN THE USE OF NTEGRATED CIRCUIT PACKAGING SYSTEMS IN .N AUTOMOTIVE ENVIRONMENT

.N OVERVIEW OF INTEGRATED CIRCUIT (IC) 'ECHNOLOGIES, COMPLEXITIES, PACKAGING :YSTEMS, RANDOM INFANT MORTALITY AND VEAROUT FAILURE MECHANISMS, AND AUTOMO-'IVE ENVIRONMENTS IS PRESENTED TO PROVIDE .NSIGHT INTO RELIABILITY CONSIDERATIONS IN THE USE OF INTEGRATED CIRCUIT PACKAGING SYSTEMS IN AN AUTOMOTIVE ENVIRONMENT. TO UNDERSTAND THE DIRECTION IN WHICH INTEGRATED CIRCUITS ARE HEADING AND TO UNDERSTAND THE PROBLEM AREAS OF THE PAST, A LARGE COMMITMENT OF RESOURCES IS REQUIRED OF THE USER. AT PRESENT, THE AUTOMOTIVE INDUSTRY LACKS PERSONNEL WITH SUFFICIENT UNDERSTANDING OF IC QUALITY AND RELIABILITY PITFALLS. UNTIL THE AUTOMOTIVE INDUSTRY IS STAFFED TO THE LEVEL OF A SOPHISTICATED KEY CUSTOMER, REPLIES TO RELIABILITY OR QUALITY INQUIRIES MAY VERY LIKELY BE MISCOMMUNICATED, RESULTING IN MISUNDERSTANDINGS AND LACK OF PROBLEM SOLVING. IC RELIABILITY SPECIFICATIONS SHOULD INCLUDE BOTH AN EXPECTED FAILURE RATE AND A TOTAL LIFE EXPECTANCY. THE EXPECTED FAILURE RATE IS THE USER'S ESTIMATE OF A COST-EFFECTIVE FAILURE RATE FOR HIS/HER APPLICATION. SOME APPLICATIONS, SUCH AS ENGINE CONTROL, MAY REQUIRE LOWER FAILURE RATES THAN NONCRITICAL APPLICATIONS SUCH AS CAR RADIOS. THE ACTUAL FAILURE RATES OF IC'S ARE PRIMARILY THE RESULT OF RANDOM FAILURE MECHANISMS. THE MEASUREMENT OF ACTUAL FAILURE RATE USUALLY STARTS WITH A DETERMINATION OF THE BASIC FAILURE RATE DERIVED FROM BENIGN ENVIRONMENT LIFE TESTS. FOR CRITICAL APPLICATIONS, SOME USERS APPLY 100% SCREENING PROGRAMS TO IC'S AS INSURANCE AGAINST THE POSSIBILITY OF MARGINAL IC'S BEING PRESENT. UNFORTUNATELY, NO SIMPLE DECISIONS CAN BE MADE ABOUT MICROCIRCUIT SCREENING EFFECTIVENESS IN LOWERING FAILURE RATES FOR A SPECIFIC APPLICATION. IN DEFENSE OF IC'S, THE FAILURE RATE IS EXTREMELY LOW. THE RELIABILITY PER COMPONENT IS DOUBLING EVERY YEAR TO KEEP PACE WITH THE INCREASE IN DEVICE COMPLEXITY. IC'S ARE MADE ON LARGE VOLUME PRODUCTION LINES WITH GOOD REPEATABILITY. FOR AN ASSESSMENT OF TOTAL LIFE EXPECTANCY, THE AUTOMOTIVE ENVIRONMENT MUST BE COMPARED TO KNOWN WEAROUT MECHANISMS OF IC'S. NO SUBSTITUTE EXISTS FOR DEFINING EACH IC APPLICATION IN TOTALITY AND CONSCIOUSLY EVALUATING THE TRADE-OFFS OF THE VARIOUS IC TECHNOLOGIES AND THE PACKAGE SYSTEM PERFORMANCE LEVELS. A TABLE IS PRESENTED WHICH GIVES A GENERAL COMPARISON OF STATE-OF-THE-ART PACKAGING SYSTEMS VS. EXPECTED PERFORMANCE LEVELS.

by J. N. THIELMANN
SIGNETICS CORP.
Rept. No. SAE-770229; 1977; 37P 20REFS
PRESENTED AT INTERNATIONAL AUTOMOTIVE ENGINEERING CONGRESS AND EXPOSITION, DETROIT, 28 FEB-4 MAR 1977.
Availability: SAE

HS-022 491

PENNSYLVANIA'S ACCIDENT RECORD SYSTEM. VOL. 2: USERS ACCIDENT DATA REQUIREMENTS

THE INDIVIDUAL REQUIREMENTS, FOR ACCIDENT DATA AND THE MANNER IN WHICH THEY ARE PROVIDED, OF THE 13 BUREAUS OR AGENCIES WHICH UTILIZE THE PENNSYLVANIA ACCIDENT RECORD SYSTEM ARE PRESENTED. THE PENNSYLVANIA DEPT. OF TRANSPORTATION (OR RELATED) USERS OF THIS ACCIDENT RECORD SYSTEM ARE AS FOLLOWS: BUREAU OF ACCIDENT ANALYSIS; BUREAU OF ADVANCE PLANNING; BUREAU OF DESIGN; BUREAU OF ECONOMIC RES. AND PROGRAMMING; HAZARDOUS SUBSTANCES TRANSPORTATION BOARD; HWY. SAFETY GROUP; BUREAU OF MAINTENANCE; BUREAU OF MATERIALS, TESTING AND RES.; BUREAU OF TRAFFIC ENGINEERING; BUREAU OF TRAFFIC SAFETY; BUREAU OF TRANSPORTATION PLANNING STATISTICS; GOVERNOR'S COUNCIL ON

THE BUREAUS HAVE EACH OUTLINED THEIR NEEDS IN TWO SECTIONS, THE FIRST GIVING A GENERAL SUMMARY OF THE BUREAU'S USES (E.G. REPORTS) FOR ACCIDENT DATA, THE SECOND PROVIDING A DETAILED NARRATIVE OF THE DATA REQUIREMENTS BY USE (I.E. AN AMPLIFICATION OF THE USE OF ACCIDENT DATA; A DISCUSSION OF THE REPORT(S) NEEDED INCLUDING SOME REPORT ELEMENTS, KEY REPORT ORDER, AND GENERAL REPORT STRUCTURE; AND GENERAL SPECIFICATIONS FOR REPORT PRODUCTION INCLUDING MEDIUM(S) DESIRED, FREQUENCY OF REQUESTS, DATA AGE (E.G. THE LATEST DATA AVAILABLE), AND TIME PERIOD OF DATA (E.G. THREE YEARS OF DATA). PRIORITY RANKINGS FOR PRODUCTION OF VARIOUS REPORTS/INFORMATION FOR EACH BUREAU/AGENCY ARE ALSO GIVEN.

PENNSYLVANIA DEPT. OF TRANSPORTATION,
BUREAU OF ACCIDENT ANALYSIS
1977; 166P
Availability: CORPORATE AUTHOR

HS-022 492

ENERGY ABSORPTION OF HIGH-STRENGTH STEEL TUBES UNDER IMPACT CRUSH CONDITIONS

THE ENERGY ABSORPTION OF AUTOMOTIVE STEELS (CONVENTIONAL SHEET STEELS AND HIGH-STRENGTH LOW-ALLOY (HSLA) STEELS) WAS DETERMINED AT IMPACT SPEEDS TO 40 MPH BY CRUSHING TUBULAR STRUCTURES AT 70° AND -40° F. THE TEST PROGRAM WAS DESIGNED TO PROVIDE AN INTERMEDIATE STEP BETWEEN TENSILE AND VEHICLE TESTS AIMED AT UNDERSTANDING MATERIAL BEHAVIOR AT HIGH IMPACT SPEEDS. ENERGY ABSORPTION WAS FOUND TO INCREASE WITH IMPACT VELOCITY, STRENGTH, THICKNESS, AND THE LOWER TEMPERATURE. TUBE GEOMETRY ALSO INFLUENCED THE AMOUNT OF ENERGY ABSORBED. SPECIFICALLY, A SQUARE TUBE ABSORBS A THIRD LESS ENERGY THAN A CIRCULAR TUBE FOR AN EQUAL VOLUME OF MATERIAL. THE NEW HSLA STEELS PROVIDE EXCELLENT ENERGY ABSORPTION AND DESIGNERS CAN USE THESE STEELS AT RELATIVELY LIGHT GAUGES TO REDUCE VEHICLE WEIGHT WITHOUT SACRIFICING CRASHWORTHINESS, EVEN AT LOW TEMPERATURE.

by R. C. VANKUREN; J. E. SCOTT
BETHELEM STEEL CORP., RES. DEPT.
Rept. No. SAE-770213; 1977; 11P 3REFS
PRESENTED AT INTERNATIONAL AUTOMOTIVE ENGINEERING CONGRESS AND EXPOSITION, DETROIT, 28 FEB-4 MAR 1977.
Availability: SAE

HS-022 493

ULTIMATE STRENGTH AND FAILURE MODE OF SPOT WELDS IN HIGH STRENGTH STEELS

THE STRENGTH AND FAILURE MODE OF A RESISTANCE SPOT WELD BETWEEN TWO SHEETS OF STEEL ARE SHOWN TO BE DEPENDENT UPON THE THICKNESS AND YIELD STRENGTH OF THE BASE MATERIAL, THE DIAMETER OF THE WELD, THE STRENGTH OF THE WELD METAL, AND THE RESTRAINT IMPOSED BY THE MATERIAL SURROUNDING THE WELD. A RELATIONSHIP IS DEVELOPED WHICH MAKES POSSIBLE THE RELIABLE CALCULATION OF THE WELD DIAMETER REQUIRED TO CAUSE HEAT-AFFECTED ZONE FAILURE AROUND THE WELD WHEN LOADED IN SHEAR. IT APPLIES TO PLAIN CARBON STEEL AND THE HIGH STRENGTH, MICRO-ALLOYED STEELS OF UP TO 690 MPA (100,000 PSI) YIELD STRENGTH. THIS RELATIONSHIP, ALONG WITH ANOTHER RELATING WELD FAILURE LOAD TO THE BASE METAL STRENGTH, FORM THE BASIS FOR PROPOSED WELDABILITY CRITERIA FOR LOW CARBON STEEL.

by D. J. VANDENBOSSCHE
CHRYSLER CORP.
Rept. No. SAE-770214; 1977; 14P 6REFS
PRESENTED AT INTERNATIONAL AUTOMOTIVE ENGINEERING CONGRESS AND EXPOSITION, DETROIT, 28 FEB-4 MAR 1977.
Availability: SAE

HS-022 494

980 XK: A CRITICAL AUTOMOTIVE APPLICATION FOR HSLA [HIGH STRENGTH LOW ALLOY] STEEL

SAE 980 XK STEEL, AN 80 KSI (552 MPA) HSLA (HIGH-STRENGTH LOW-ALLOY) STEEL, IS USED BY THE AMERICAN MOTORS CORP. (AMC) IN ITS 1977 GREMLIN AND HORNET UNDERBODY REAR SILL SUBASSEMBLIES. THE APPLICATION OF THIS STEEL WAS IN RESPONSE TO INCREASED STRUCTURAL REQUIREMENTS AS DEFINED IN THE EXPANDED FEDERAL MOTOR VEHICLE SAFETY STANDARD (FMVSS) 301. THIS STANDARD REQUIRES THAT VEHICLES BE ABLE TO WITHSTAND A 30 MPH (48.3 KPH) REAR BARRIER IMPACT, NO RUPTURE WITH IN THE FUEL SYSTEM. THE PRINCIPAL REASONS FOR USING THIS STEEL IN THIS APPLICATION ARE INCREASED RELIABILITY AND COST EFFECTIVENESS. THESE ADVANTAGES ARE A FUNCTION OF FEWER PARTS WITH GREATLY REDUCED WELDING REQUIREMENTS, RESULTING IN A MORE INTEGRATED, CONTROLLABLE DESIGN. THE USE OF 980 XK STEEL IN THIS APPLICATION IS UNIQUE TO THE DESIGN GEOMETRY OF THESE CAR LINES AND THEIR SAFETY REQUIREMENTS. SELECTING THIS STEEL PROVIDED A TOTAL ASSEMBLY WHICH REQUIRED LESS TOOLING AND MANUFACTURING INVESTMENTS WITH THE ADDED BENEFIT OF SIMPLIFYING QUALITY CONTROL WITH FEWER SAFETY-RELATED PARTS. THE PRODUCTION EXPERIENCE OBTAINED IN THE FORMING AND SPOT WELDING OF THIS PART WILL PROVIDE THE INDUSTRY WITH DATA TO EXPAND THE USE OF THIS STEEL FOR FURTHER WEIGHT REDUCTION PROGRAMS. FORMABILITY AND SPOT WELDABILITY CHARACTERISTICS WERE OPTIMIZED TO MEET THE VEHICULAR CRASHWORTHINESS REQUIRED IN THIS STRUCTURAL APPLICATION. TRADITIONAL MILD STEEL DESIGN, FORMING,

AND SPOT WELDING PROCEDURES WERE SUCCESSFULLY MODIFIED TO UTILIZE 980 XK.

by JOHN J. JURKOWSKI; ROBERT N. KELLER
NATIONAL STEEL CORP.
Rept. No. SAE-770215; 1977; 12P 8REFS
PRESENTED AT INTERNATIONAL AUTOMOTIVE ENGINEERING CONGRESS AND EXPOSITION, DETROIT, 28 FEB-4 MAR 1977.
Availability: SAE

HS-022 495

WELDING PROCESSING FOR HSLA [HIGH STRENGTH LOW ALLOY] STEELS IN UNITIZED BODY CONSTRUCTION

THE WELDING, ASSEMBLY, AND QUALITY CONTROL PROCEDURES DEVELOPED BY THE AMERICAN MOTORS CORP. (AMC) MANUFACTURING ENGINEERS TO ASSURE THAT UNDERBODY REAR SILL SUBASSEMBLIES OF THE 1977 GREMLIN AND HORNET CONSTRUCTED OF SAE 980 XK HIGH STRENGTH LOW ALLOY (HSLA) STEEL MEET ALL DESIGN SPECIFICATIONS AS OUTLINED IN THE EXPANDED FEDERAL MOTOR VEHICLE SAFETY STANDARD (FMVSS) 301. COMMENCING WITH THE 1977 MODEL PRODUCTION, FMVSS 301 WAS EXPANDED TO REQUIRE A REAR BARRIER TEST. SPECIFICALLY, THE 1977 GREMLIN AND HORNET MODEL VEHICLES ARE REQUIRED TO WITHSTAND A 4000-LB (1816 KG) MOVING BARRIER STRIKING THE REAR BODY STRUCTURE AT 30 MPH (48.3 KPH). FURTHER, THERE CAN BE NO FUEL LOSS EITHER DURING OR AFTER THE SIMULATED ACCIDENT. THE CHALLENGE TO MANUFACTURERS OF COMPACT CARS, SUCH AS THE GREMLIN AND HORNET, WHICH HAVE MINIMUM REAR BODY OVERHANG, WAS A MAJOR TASK. THIS IS THE FIRST KNOWN APPLICATION OF 80 KSI (552 MPA) HSLA STEEL FOR A UNITIZED AUTO BODY MAJOR STRUCTURAL COMPONENT.

by CHARLES F. PADDEN
AMERICAN MOTORS CORP.
Rept. No. SAE-770216; 1977; 16P 8REFS
PRESENTED AT INTERNATIONAL AUTOMOTIVE ENGINEERING CONGRESS AND EXPOSITION, DETROIT, 28 FEB-4 MAR 1977.
Availability: SAE

HS-022 496

EFFECTS OF SWIRL AND SQUISH ON S.I. [SPARK IGNITION] ENGINE COMBUSTION AND EMISSION

THE EFFECT OF INTENSIFIED SWIRL AND SQUISH ON COMBUSTION AND EXHAUST EMISSIONS IN A SPARK IGNITION ENGINE WAS STUDIED USING A FOUR-CYLINDER, 1.4-LITER ENGINE. SWIRL WAS INTENSIFIED BY MODIFYING INTAKE PORT ANGLE AND SQUISH WAS CONTROLLED BY MODIFYING SQUISH AREA AND CLEARANCE. IN VARYING GAS FLOW IN THE COMBUSTION CHAMBER, SWIRL WAS FOUND TO REACH THE MAXIMUM INTENSITY IN THE FIRST HALF OF THE INTAKE STROKE, AND SQUISH, DIRECTLY BEFORE THE COMPRESSION TOP DEAD CENTER. AN INCREASE IN SWIRL INTENSITY REDUCED THE IGNITION DELAY AND REMARKEDLY IMPROVED BOTH THE MISFIRE LIMIT AND CYCLE-TO-CYCLE FLUCTUATION RATE; THESE EFFECTS MADE LEAN OPERATION POSSIBLE. AN INCREASE IN SQUISH INTENSITY INCREASED FLAME VELOCITY AT THE MAIN COMBUSTION STAGE AND RESULTED IN AN INCREASE IN TORQUE AND MAXIMUM PRESSURE. AN INCREASE IN BOTH SWIRL AND SQUISH INTENSITY MADE LEAN OPERATION POSSIBLE AND SIMULTANEOUSLY IMPROVED TORQUE ESPECIALLY ON THE LEAN SIDE, ULTIMATELY LEADING TO IMPROVEMENT IN FUEL CONSUMPTION RATE. WITH IMPROVEMENT IN MISFIRE LIMIT, HYDROCARBON DECREASED ON THE LEAN SIDE. ON THE OTHER HAND, NITROGEN OXIDE INCREASED BECAUSE OF MAXIMUM PRESSURE RISE WHICH WAS BROUGHT ABOUT BY SHORTER COMBUSTION DURATION. LEAN OPERATION WHICH WAS MADE POSSIBLE BY INTENSIFICATION OF BOTH SWIRL AND SQUISH PRODUCED RATHER FAVORABLE RESULTS ON NITROGEN OXIDE CONTROL AS WELL AS FUEL CONSUMPTION RATE AND DRIVEABILITY.

by ISAO NAGAYAMA; YASUSHI ARAKI; YASUO IIOKA
NISSAN MOTOR CO., LTD., JAPAN
Rept. No. SAE-770217; 1977; 12P 13REFS
PRESENTED AT INTERNATIONAL AUTOMOTIVE ENGINEERING CONGRESS AND EXPOSITION, DETROIT, 28 FEB-4 MAR 1977.
Availability: SAE

HS-022 497

DIGITAP--AN ON-LINE ACQUISITION AND PROCESSING SYSTEM FOR INSTANTANEOUS ENGINE DATA--APPLICATIONS

A VERSATILE DATA ACQUISITION SYSTEM, DIGITAP (DIGITIZATION-ANGLE-PRESSURE), FOR ENGINE PRESSURE-TIME HISTORY UTILIZES A 12-BIT SAMPLE-AND-HOLD ANALOG-TO-DIGITAL (A/D) CONVERTER IN CONJUNCTION WITH A MINICOMPUTER. THE COMPUTER CONTROLS THE ACQUISITION PROCESS AND PERFORMS DATA PROCESSING TO GENERATE THE DESIRED RESULTS. THE TIME BASE FOR THE SYSTEM IS GENERATED BY A SHAFT-MOUNTED DISK AND PHOTOELECTRIC SENSORS. ON-LINE SELECTION BASED ON PREDEFINED CRITERIA OF PARTICULAR INTEREST IS SOFTWARE IMPLEMENTED. STATISTICAL DATA ARE AVAILABLE SUCH AS THE STANDARD DEVIATION AND THE HISTOGRAM OF MAXIMUM PRESSURE. TELETYPE PRINT, XY PLOT, AND PUNCHED PAPER TAPE ARE STANDARD OUTPUTS. AMONG THE WIDE VARIETY OF POTENTIAL APPLICATIONS OF THIS SYSTEM, SOME ACTUAL EXAMPLES ARE GIVEN WHICH INCLUDE CYCLIC VARIATION, KNOCK, FRICTION LOSSES, AND HEAT TRANSFER. THE GREAT RELIABILITY OF THE SYSTEM, AS DEMONSTRATED BY SEVERAL THOUSAND HOURS OF OPERATION WITHOUT SIGNIFICANT FAILURE IN THE ENGINE ENVIRONMENT TESTING FACILITIES, AND ITS EASE OF USE, ENABLE IT TO BE OPERATED BY ENGINE TECHNICIANS WITHOUT PARTICULAR TRAINING IN DATA PROCESSING. THIS MAKES DIGITAP A REMARKABLY EFFECTIVE TOOL FOR RESEARCH AND DEVELOP

MENT IN THE FIELD OF INTERNAL COMBUSTION ENGINES.

by A. DOUAUD; P. EYZAT
INSTITUT FRANCAIS DU PETROLE, FRANCE
Rept. No. SAE-770218; 1977; 16P 15REFS
PRESENTED AT INTERNATIONAL AUTOMOTIVE ENGINEERING CONGRESS AND EXPOSITION, DETROIT, 28 FEB-4 MAR 1977.
Availability: SAE

HS-022 498

EQUIVALENCE RATIO METER [ENGINE AIR/FUEL MIXTURES]

AN INSTRUMENT HAS BEEN DEVELOPED TO MEASURE RAPID CHANGES IN ENGINE AIR/FUEL MIXTURES BY CONTINUOUSLY ANALYZING THE EXHAUST GAS. THE INSTRUMENT IS BASED ON THE MEASUREMENT OF THE RESIDUAL OXYGEN CONCENTRATION AFTER A SAMPLE OF EXHAUST GAS HAS BEEN MIXED WITH AIR AND OXIDIZED BY A CATALYST. THE OXYGEN CONCENTRATION IS MEASURED BY A FAST-RESPONDING ZIRCONIA SENSOR, WHICH IS SIMILAR TO THOSE USED FOR FEEDBACK MIXTURE CONTROL, ALTHOUGH THE MODE OF OPERATION IS DIFFERENT. THE INSTRUMENT ACCURACY IS AS GOOD AS THE STANDARDS AGAINST WHICH IT HAS BEEN COMPARED (PLUS OR MINUS 1%) WHILE THE RESPONSE TIME IS AROUND 0.5 SECOND. THIS EQUIVALENCE RATIO METER IS BELIEVED TO BE THE ONLY INSTRUMENT CURRENTLY AVAILABLE WHICH IS CONVENIENT TO USE AND WHICH PROVIDES A DIRECT READOUT OF TRANSIENT AIR/FUEL RATIO (A/F). DESCRIBED HEREIN ARE THE CONCEPT, DESIGN, AND DEVELOPMENT OF THE PROTOTYPE INSTRUMENT, INCLUDING THE CALIBRATION TESTS ON GAS MIXTURES AND AN ENGINE. IN ADDITION, THE EQUIVALENCE RATIO CHARACTERISTICS OF A NUMBER OF CURRENT AND ADVANCED ENGINES ARE PRESENTED WHICH HAVE BEEN MONITORED WITH A MORE SOPHISTICATED METER DESIGNED FOR PRODUCTION.

by R. A. HASLETT; T. M. EIDSON
RICARDO AND CO., LTD.; FORD MOTOR CO.
Rept. No. SAE-770219; 1977; 15P 4REFS
PRESENTED AT INTERNATIONAL AUTOMOTIVE ENGINEERING CONGRESS AND EXPOSITION, DETROIT, 28 FEB-4 MAR 1977.
Availability: SAE

HS-022 499

MEASUREMENTS OF THE SPATIAL DISTRIBUTION AND ENGINE SPEED DEPENDENCE OF TURBULENT AIR MOTION IN AN I.C. [INTERNAL COMBUSTION] ENGINE

MEASUREMENTS WERE MADE OF THE SPATIAL DISTRIBUTION AND ENGINE SPEED DEPENDENCE OF TURBULENT AIR MOTION IN A MOTORED INTERNAL COMBUSTION ENGINE. USING A HOT-WIRE ANEMOMETER, MEASUREMENTS WERE MADE OF THE MEAN VELOCITY, TURBULENCE INTENSITY, AND INTEGRAL SCALES OF TURBULENCE. THE ENGINE SPEED WAS VARIED FROM 500 TO 2500 RPM, AND THE HOT-WIRE PROBE WAS TRAVERSED BOTH ACROSS THE COMBUSTION CHAMBER CLEARANCE VOLUME AND DOWN INTO THE PISTON SWEEP VOLUME. THE LATTER TRAVERSE WAS ACCOMPLISHED BY PROBE-ACCOMMODATING "WELLS" BUILT INTO THE PISTON CROWN, WHICH WERE SUBSEQUENTLY SHOWN TO SEVERELY DISRUPT THE FLOW DURING THE COMPRESSION AND EXPANSION STROKES. BECAUSE OF THE INHERENT LIMITATIONS IN USING THE HOT-WIRE ANEMOMETER IN A RECIPROCATING ENGINE, EVEN THOUGH IT IS ONLY BEING MOTORED, GENERALIZED STATEMENTS OF THE TRENDS OBSERVED ARE PRESENTED. FIRST, BOTH THE MEAN VELOCITY AND TURBULENCE INTENSITY VARY LINEARLY WITH ENGINE SPEED. THE RELATIVE TURBULENCE INTENSITY DURING INDUCTION AND COMPRESSION IS APPROXIMATELY CONSTANT AT 0.5. THE INTEGRAL TIME SCALE OF TURBULENCE IS INVERSELY PROPORTIONAL TO ENGINE SPEED, SUCH THAT WHEN EXPRESSED IN TERMS OF DEGREES OF CRANK ANGLE IT IS A FUNCTION OF ONLY THE ENGINE GEOMETRY. THE VERY APPROXIMATE INTEGRAL LENGTH SCALE IS ALSO ONLY A FUNCTION OF GEOMETRY, ALTHOUGH THERE IS SOME INDICATION OF A REDUCTION IN SCALE DURING COMPRESSION FOR LOW ENGINE SPEEDS. THE TURBULENT REYNOLDS NUMBER AT PEAK PRESSURE IS LARGE, ON THE ORDER OF 10 TO THE 5TH POWER, WHICH SUGGESTS THAT AN INERTIAL SUBRANGE IS POSSIBLE. TURBULENCE PRODUCTION BY A SQUISH VOLUME WOULD APPEAR TO BE INSIGNIFICANT WHEN COMPARED TO THE COMPRESSION STROKE ENHANCEMENT OF INTAKE-GENERATED TURBULENCE. FINALLY, THE TURBULENCE STRUCTURE IS INHOMOGENEOUS IN THE CLEARANCE VOLUME AND THE UPPER PORTION OF THE SWEEP VOLUME. IT IS NOT KNOWN WHETHER THE AMOUNT OF SPATIAL VARIATION IS LARGE ENOUGH TO BE SIGNIFICANT TO THE DEGREE OF MIXEDNESS AND THE FLAME PROPAGATION PROCESS IN THE COMBUSTING ENGINE.

by PETER O. WITZE
SANDIA LABS.
ERDA-AT-(29-1)-789
Rept. No. SAE-770220; 1977; 15P 12REFS
PRESENTED AT INTERNATIONAL AUTOMOTIVE ENGINEERING CONGRESS AND EXPOSITION, DETROIT, 28 FEB-4 MAR 1977.
Availability: SAE

HS-022 500

HEAT BALANCE PROVIDES INSIGHT INTO MODERN ENGINE FUEL UTILIZATION

HEAT BALANCE STUDIES WERE CONDUCTED ON A 1975 PRODUCTION 5.74-L (350 CU IN) V-8 ENGINE AND AN EXPERIMENTAL 3.69-L (225 CU IN) V-6 ENGINE IN ORDER TO DETERMINE SOURCES OF FUEL ECONOMY DIFFERENCES BETWEEN THE TWO ENGINES WHEN OPERATED AT VARIOUS SIMULATED VEHICLE LOADS AND SPEEDS. DYNAMOMETER TESTS WERE RUN AT ROAD-LOAD CONDITIONS SIMULATING VEHICLE OPERATION BETWEEN 32 AND 97 KPH (20 AND 60 MPH); AND HEAT BALANCE RESULTS, FRICTION, AND FUEL ECONOMY WERE EXPLORED, COM-

PARING OPERATION WITH AND WITHOUT CERTAIN EMISSION CONTROL FEATURES. BY CAREFUL MEASUREMENT OF BRAKE WORK, HEAT REJECTED TO THE COOLANT AND EXHAUST ENERGY, IT WAS POSSIBLE TO ACCOUNT FOR NEARLY 95% OF THE HEAT OF COMBUSTION OF THE FUEL. THE ADDITION OF CALCULATED RADIATION LOSSES FROM THE EXHAUST MANIFOLDS BROUGHT THE ACCOUNTED FOR TOTAL TO APPROXIMATELY 100%. WITH MBT (MAXIMUM BRAKE TORQUE) SPARK TIMING, A 16:1 AIR/FUEL RATIO (A/F) AND NO EGR (EXHAUST GAS RECIRCULATION), THE DISTRIBUTION OF THE FUEL HEAT OF COMBUSTION AT ROAD LOAD FOR EITHER ENGINE WAS TYPICALLY AS FOLLOWS: BRAKE WORK, 20%; COOLANT, 50%; EXHAUST, 25%; AND RADIATION LOSS, 5%. AS CALIBRATED TO MEET THE 1975 FEDERAL EMISSION STANDARDS, THE PRODUCTION V-8 ENGINE WAS FAR FROM OPTIMIZED FOR FUEL ECONOMY WHEN OPERATED ON HIGH OCTANE TEST FUEL. A 10%-15% IMPROVEMENT WAS ACHIEVED THROUGH SPARK AND CARBURETOR ADJUSTMENTS. ON THE OTHER HAND, THE EXPERIMENTAL V-6 WAS REASONABLY WELL OPTIMIZED AS CALIBRATED TO MEET THE SAME STANDARDS AND FURTHER ADJUSTMENTS DID NOT SUBSTANTIALLY IMPROVE ENGINE EFFICIENCY. WITH A 16:1 A/F AND MBT SPARK TIMING WITHOUT EGR, CALCULATIONS SHOWED THE SMALLER DISPLACEMENT V-6 ENGINE (3.08 AXLE) WOULD ACHIEVE ABOUT 10% BETTER FUEL ECONOMY THAN THE V-8 ENGINE (2.73 AXLE) WHEN INSTALLED IN THE SAME 2168 KG (4780 LB) VEHICLE. THE CALCULATED GAIN WAS 20% WITH EQUAL AXLE RATIOS OF 2.73. WITHIN THE LIMITATIONS OF COMPARING INDICATED ENGINE QUANTITIES, THERE APPEARED TO BE LITTLE IF ANY DIFFERENCE IN ROAD-LOAD-INDICATED EFFICIENCY BETWEEN THE OPTIMIZED ENGINES AS THEY MIGHT HAVE BEEN INSTALLED IN A VEHICLE WITH DIFFERENT AXLE RATIOS FOR EACH. FRICTION RATHER THAN COMBUSTION DIFFERENCES ACCOUNTED FOR THE ECONOMY ADVANTAGE OF THE SMALLER DISPLACEMENT V-6.

by FRANK AMENT; DONALD J. PATTERSON; ARVIN MUELLER
GENERAL MOTORS CORP.; UNIVERSITY OF MICHIGAN, DEPT. OF MECHANICAL ENGINEERING
Rept. No. SAE-770221; 1977; 14P 12REFS
PRESENTED AT INTERNATIONAL AUTOMOTIVE ENGINEERING CONGRESS AND EXPOSITION, DETROIT, 28 FEB-4 MAR 1977.
Availability: SAE

HS-022 501

MODELING THE COMPLETE OTTO CYCLE--PRELIMINARY VERSION

A DESCRIPTION IS GIVEN OF THE EQUATIONS AND THE COMPUTER PROGRAM BEING DEVELOPED TO MODEL THE COMPLETE INTERNAL COMBUSTION ENGINE CYCLE. THE PROGRAM INCORPORATES SUCH IMPORTANT FEATURES AS HEAT TRANSFER, FINITE COMBUSTION RATES, COMPLETE CHEMICAL KINETICS IN THE BURNED GAS, EXHAUST GAS RECIRCULATION, AND MANIFOLD VACUUM OR SUPERCHARGING. CHANGES IN THERMODYNAMIC, MODEL PARAMETERS CAN BE MADE WITHOUT REPROGRAMMMING. BASED ON PRELIMINARY CALCULATIONS, A NUMBER OF CONCLUSIONS ABOUT MODELING THE COMPLETE OTTO CYCLE ARE DRAWN. FIRST, AND MOST IMPORTANT, IT IS FEASIBLE AND PRACTICAL TO MODEL THE COMPLETE CYCLE WITH ORDINARY DIFFERENTIAL EQUATIONS WITH BOTH EXPANDED FINITE RATE CHEMISTRY DURING THE COMBUSTION AND POSTCOMBUSTION PHASES AND HEAT TRANSFER. SECOND, CHEMISTRY AND HEAT TRANSFER SIGNIFICANTLY AFFECT NOT ONLY COMPOSITION BUT ALSO MEASURES OF CYCLE PERFORMANCE SUCH AS WORK. THIRD, THERE APPEARS TO BE A SUFFICIENTLY STRONG INTERACTION AMONG MODEL PARAMETERS SO AS TO PRECLUDE THE ISOLATION OF INDIVIDUAL PARAMETERS FOR EXPERIMENTAL DETERMINATION. IT MAY BE NECESSARY TO EVALUATE A NUMBER OF INDIVIDUAL PARAMETERS SIMULTANEOUSLY. FOURTH, IN THE SEQUENCE OF CYCLE CALCULATIONS PRESENTED, IT SEEMS THAT ONE CAN ADEQUATELY DETERMINE STEADY-STATE CONDITIONS. LAST, THE ESTIMATION OF POLLUTANT CONCENTRATIONS BY NEGLECTING FINITE RATE CHEMISTRY OR HEAT TRANSFER IS QUESTIONABLE.

by FRANK J. ZELEZNIK; BONNIE J. MCBRIDE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, LEWIS RES. CENTER
Rept. No. SAE-770223; 1977; 20P 19REFS
PRESENTED AT INTERNATIONAL AUTOMOTIVE ENGINEERING CONGRESS AND EXPOSITION, DETROIT, 28 FEB-4 MAR 1977.
Availability: SAE

HS-022 502

EXHAUST EMISSION CONTROL OF S.I. [SPARK IGNITION] ENGINES BY ENGINE MODIFICATION--THE SEEC-T SYSTEM [SUBARU]

A DESCRIPTION IS GIVEN OF THE SEEC-T (SUBARU EXHAUST EMISSION CONTROL - THERMAL AND THERMODYNAMIC CONTROL) SYSTEM WHICH EMPLOYS A NUMBER OF ADVANCED ENGINE MODIFICATIONS TO REDUCE THE LEVEL OF THREE COMPONENTS IN EXHAUST EMISSIONS, HYDROCARBONS, CARBON MONOXIDE, AND NITROGEN OXIDES (HC, CO, NOX) TAKING INTO CONSIDERATION DRIVEABILITY, FUEL ECONOMY, AND OTHER FACTORS. THIS SYSTEM REDUCES THOSE EMISSIONS TO MEET THE 1977 EMISSION STANDARDS OF U.S., INCLUDING CALIFORNIA, AND THE 1976 STANDARDS OF JAPAN WITHOUT THE USE OF CATALYTIC CONVERTERS OR THERMAL REACTORS; THE SYSTEM WILL ALSO SATISFY THE MORE STRINGENT EMISSION STANDARDS EXPECTED IN THE FUTURE. THE ENGINE MODIFICATIONS INCLUDE A SECONDARY AIR INTRODUCTION SYSTEM, AN EXHAUST GAS RECIRCULATION (EGR) SYSTEM, AND AN INSULATED EXHAUST MANIFOLD. FIRST, THE AIR/FUEL RATIO (A/F) IS SET LEANER THAN STOICHIOMETRIC BY IMPROVEMENTS IN THE CARBURETOR. COMBUSTION GAS TEMPERATURE IS CONTROLLED BY EGR AND IGNITION TIMING CONTROL. INTRODUCTION OF SECONDARY AIR INTO THE CYLINDER BY BACKFLOW FROM THE EXHAUST PORT IMPROVES

CO, AND NOX ARE REDUCED WITHIN THE CYLINDER. SECOND, EXHAUST PORT LINERS INSERTED IN A SIAMESE-TYPE EXHAUST PORT REDUCE HC AND CO DISCHARGED FROM CYLINDERS BY HOLDING THE EXHAUST GAS AT HIGHER TEMPERATURES. THIRD, AN INSULATED EXHAUST MANIFOLD HELPS TO LOWER RESIDUAL HC AND CO.

by TATSUHISA FUKUSHIMA; HIROYUKI NAKAMURA; TATSUO SAKAI
FUJI HEAVY INDUSTRIES LTD., JAPAN
Rept. No. SAE-770224; 1977; 16P 5REFS
PRESENTED AT INTERNATIONAL AUTOMOTIVE ENGINEERING CONGRESS AND EXPOSITION, DETROIT, 28 FEB-4 MAR 1977.
Availability: SAE

HS-022 503

BASIC RELIABILITY ENGINEERING CONCEPTS FOR AUTOMOTIVE ELECTRONIC SYSTEMS

AN OVERVIEW OF RELIABILITY ENGINEERING FOR ELECTRONIC SYSTEMS IS PRESENTED AS AN AID TO THE NEWCOMER, BOTH MANAGER AND TECHNOLOGIST, IN UNDERSTANDING THE TOOLS THAT ARE AVAILABLE TO ASSIST THE AUTOMOTIVE INDUSTRY IN ACHIEVING A SHORTER DESIGN/DEVELOPMENT CYCLE, REDUCING COSTS AND INCREASING CUSTOMER SATISFACTION. AN EFFECTIVE RELIABILITY ENGINEERING PROGRAM RECOGNIZES THAT ACHIEVEMENT OF OPERATIONAL RELIABILITY IS A DESIGN PARAMETER. DECISIONS MADE DURING THE DESIGN PROCESS INFLUENCE ALL SUBSEQUENT PHASES OF A SYSTEM'S LIFE CYCLE IN THE FORM OF PART QUALITY, PRODUCIBILITY, AND MAINTAINABILITY. THEREFORE, DELIBERATE AND POSITIVE MEASURES MUST BE INSTITUTED DURING THE DESIGN AND DEVELOPMENT PROCESS WHICH ENHANCE INHERENT RELIABILITY AND MINIMIZE THE INTRODUCTION OF LATENT DEFECTS DURING MANUFACTURING AND INSPECTION, AND DEGRADATION DURING FIELD USE. FUNDAMENTAL RELIABILITY ENGINEERING CONCEPTS, RELIABILITY MODELING, RELIABILITY PREDICTION AND ALLOCATION, FAILURE MODE AND EFFECTS ANALYSIS, RELIABILITY TESTING, AND ELEMENTS OF RELIABILITY CONTROL ARE DESCRIBED.

by HAROLD A. LAUFFENBURGER
IIT RES. INST., RELIABILITY ANALYSIS CENTER
Rept. No. SAE-770225; 1977; 8P 11REFS
PRESENTED AT INTERNATIONAL AUTOMOTIVE ENGINEERING CONGRESS AND EXPOSITION, DETROIT, 28 FEB-4 MAR 1977.
Availability: SAE

HS-022 504

RELIABILITY PREDICTION METHODOLOGY AND PROCEDURES [FOR ELECTRONIC SYSTEMS]

THE THREE BASIC METHODS EMPLOYED IN MAKING RELIABILITY PREDICTIONS (FUNCTIONAL COMPLEXITY, PARTS COUNT, AND PARTS STRESS ANALYSIS) ARE DESCRIBED ALONG WITH THEIR APPLICATIONS. A KEY ELEMENT TO PREDICTION IS AVAILABILITY OF CREDIBLE DATA ON THE COMPONENT PARTS THAT COMPRISE ELECTRONIC SYSTEMS. MAJOR ATTENTION IS GIVEN TO FAILURE RATE PREDICTION MODELS OF MILITARY STANDARDIZATION HANDBOOK MIL-HDBK-217B. MOST HANDBOOK DATA REQUIRE TRANSLATION FROM MILITARY TO TYPICAL AUTOMOTIVE CONDITIONS, PARTICUARLY WITH REGARD TO OPERATIONAL ENVIRONMENT. GUIDELINES AND RECOMMENDATIONS FOR UTILIZATION OF 217B METHODOLOGY AND DATA FOR PREDICTING RELIABILITY FOR AUTOMOTIVE ELECTRONIC SYSTEMS IS DESCRIBED. DATA AVAILABLE TO THE AUTOMOTIVE INDUSTRY FROM REPAIR ACTIVITIES CAN BE EFFECTIVELY COMBINED WITH WEIGHTING FACTORS FROM THE HANDBOOK TO DETERMINE PREDICTED FAILURE RATES FOR DEVICES USED IN CURRENT DESIGNS. SUCH ESTIMATES CAN BE FURTHER REFINED THROUGH DATA FEEDBACK DURING PROTOTYPE TESTING WHICH ALLOWS CUSTOM DEVICES TO MATURE AND THEIR FAILURE RATES TO STABILIZE. LESS PRECISE ESTIMATES CAN BE OBTAINED DURING CONCEPTUAL PHASES FROM CHARTS RELATING FAILURE RATE TO COMPLEXITY, AFTER THESE HAVE BEEN SUITABLY ADJUSTED TO A PARTICULAR AUTOMOTIVE ENVIRONMENT.

by L. A. MIRTH; R. C. WALKER
IIT RES. INST.
AF-30602-76-C-0192
Rept. No. SAE-770226; 1977; 14P 6REFS
PRESENTED AT INTERNATIONAL AUTOMOTIVE ENGINEERING CONGRESS AND EXPOSITION, DETROIT, 28 FEB-4 MAR 1977.
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HS-022 505

RELIABILITY CHARACTERISTICS OF VARIOUS MICROCIRCUIT TECHNOLOGIES

AN OVERVIEW IS PRESENTED OF MICROCIRCUIT RELIABILITY CHARACTERISTICS AS DERIVED FROM A COMPREHENSIVE DATA BASE ON MICROCIRCUIT DEVICES BEING MAINTAINED BY THE RELIABILITY ANALYSIS CENTER (RAC), A DESIGNATED DEPARTMENT OF DEFENSE INFORMATION ANALYSIS CENTER (IAC). INCLUDED IS INFORMATION ON SSI, MSI, AND LSI DIGITAL, LINEAR, AND HYBRID MICROCIRCUITS. FAILURE RATE DATA ARE PRESENTED FOR ALL TECHNOLOGIES FOR BOTH TEST AND OPERATIONAL CONDITIONS. FAILURE MODE DATA ARE PRESENTED FOR TTL, CMOS, AND HYBRID MICROCIRCUITS. EFFECTS OF PACKAGE CONFIGURATION, DEVICE COMPLEXITY, AND TEST CONDITIONS ARE REVIEWED.

by M. R. KLEIN; H. A. LAUFFENBURGER
IIT RES. INST.
Rept. No. SAE-770227; 1977; 12P 4REFS
PRESENTED AT INTERNATIONAL AUTOMOTIVE ENGINEERING CONGRESS AND EXPOSITION, DETROIT, 28 FEB-4 MAR 1977.
Availability: SAE

HS-022 506

SEMICONDUCTOR ELECTROSTATIC DISCHARGE DAMAGE PROTECTION

INFORMATION IS PRESENTED TO AID DESIGN AND PRODUCTION ENGINEERS IN ACQUIRING A BETTER UNDERSTANDING OF THE PROBLEM OF ELECTROSTATIC DISCHARGE (ESD) DAMAGE TO SEMICONDUCTOR DEVICES. A CURRENT PROBLEM PLAGUING MANY USERS OF MOS DISCRETE AND INTEGRATED CIRCUIT DEVICES IS THE HIGH DAMAGE RATE INCURRED DURING HANDLING AND NORMAL ASSEMBLY PROCESSES. THE CHARACTERISTIC HIGH IMPEDANCE INPUT GATES RENDER THESE DEVICES EXTREMELY VULNERABLE TO DAMAGE INDUCED BY ELECTROSTATIC POTENTIALS COMMONLY DEVELOPED IN THE ASSEMBLY AREA. SPECIFIC TOPICS DISCUSSED INCLUDE DEVICE PROPERTIES WHICH INTRODUCE SUSCEPTIBILITY TO ESD, SOURCES OF ESD, FAILURE ANALYSIS METHODS TO IDENTIFY ESD DAMAGE, PROTECTIVE METHODS AND MATERIALS AND A REVIEW OF ACTUAL APPLICATION EXPERIENCES. ESD PREVENTION OR ELIMINATION PROCEDURES INCLUDE THE FOLLOWING: THE GROUNDING PHILOSOPHY (USING ONLY CONDUCTIVE MATERIALS (E.G. FLOOR MATS, CHAIRS, PERSONNEL CLOTHING/WRISTSTRAPS, TRAYS, BAGS, AND FOAMS) AND HAVING ALL MATERIALS IN THE WORK AREA ELECTRICALLY CONNECTED TO A COMMON GROUND SYSTEM), CONTROLLING THE RELATIVE HUMIDITY IN THE WORK AREA, USING IONIZED AIR PRECIPITATORS IN THE WORK AREA, AND RETAINING DEVICES IN VENDOR PROTECTIVE PACKAGES. IN ADDITION, THERE ARE TWO POINTS WHICH ARE ESSENTIAL TO THE DEVELOPMENT OF AN EFFECTIVE SOLUTION TO THE ESD PROBLEM. FIRST, COMPLETE FAMILIARITY WITH THE PROPERTIES OF ALL MATERIALS IN THE MANUFACTURING, STORAGE, AND EQUIPMENT AREAS IS NECESSARY. SECOND, ALL INDIVIDUALS NEED TO BE EDUCATED AS TO THE HAZARDS INVOLVED.

by R. C. WALKER; H. C. RICKERS
IIT RES. INST.
AF-30602-76-C-0192
Rept. No. SAE-770228; 1977; 15P 28REFS
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HS-022 507

JOB DESCRIPTION AND PROFESSIONAL ROLE OF THE DRIVING INSTRUCTOR AND IMPACT ON DRIVER TRAINING--ANALYSIS OF SOCIAL CORRELATION OF THE BEHAVIOR OF DRIVING INSTRUCTORS IN THE CLASSROOM (BERUFSBILD UND BERUFSROLLE DESFAHRLEHRERS UND IHRE AUSWIRKUNGEN AUF DIE FAHRERAUSBILDUNG--UBERLEGUNGEN ZUR ANALYSE SOZIALER ZUSAMMENHANGE DES VERHALTENS VON FAHRLEHRERN IM UNTERRICHT)

BEHAVIORAL CHARACTERISTICS OF THE DRIVING INSTRUCTOR WITH RESPECT TO THE PROFESSION ARE THEORETICALLY CONSIDERED. THE ANALYSIS IS AN ATTEMPT TO DEFINE, IN CONCRETE TERMS THE ATTITUDES AND BEHAVIOR OF THE DRIVING INSTRUCTOR WITH REGARD TO HIS/HER PERSONAL UNDERSTANDING OF THE RESPONSIBILITIES OF THE PROFESSION AND TO CONSIDER THE INFLUENCE OF THIS BEHAVIOR ON THE EDUCATION PROCESS. THE RELATIONSHIP OF THE DRIVING INSTRUCTOR'S PROFESSIONAL SELF-IMAGE AND SOCIETY'S IMAGE OF THE PROFESSION (EXTERNAL IMAGE) TO THE BEHAVIOR OF THE DRIVING INSTRUCTOR ARE DISCUSSED. REFERENCE ROLES (E.G. STUDENTS, COLLEAGUES, SUPERIORS) AND THEIR CORRESPONDING DEGREES OF SANCTION RISK FOR DRIVING INSTRUCTORS AND PUBLIC SCHOOL TEACHERS ARE COMPARED. WITH REGARD TO SANCTION RISK, THE BEHAVIORAL EXPECTATIONS OF SUPERIORS (SCHOOL ADMINISTRATION, EDUCATIONAL SUPERVISION) GENERALLY HAVE HIGH PRIORITY FOR PUBLIC SCHOOL TEACHERS. OBSERVATION OF THIS PRIORITY GUARANTEES PROFESSIONAL SECURITY, STABILITY, AND CONTINUITY. ON THE OTHER HAND, FOR THE DRIVING INSTRUCTOR THE GREATEST SANCTION RISK IS ASSOCIATED WITH THE EXPECTATIONS OF HIS/HER STUDENTS SINCE HE/SHE IS ECONOMICALLY DEPENDENT UPON THEM. WITH RESPECT TO IMPROVING THE PROFESSIONAL SITUATION AND PROFESSIONAL PERFORMANCE OF THE DRIVING INSTRUCTOR, THE FOLLOWING MEASURES ARE DEEMED MOST IMPORTANT: RAISING DRIVING INSTRUCTOR QUALIFICATIONS, PRIMARILY BETTER BACKGROUND IN THEORY INSTRUCTION; CHANGING THE EXTERNAL IMAGE OF THE DRIVING INSTRUCTOR IN ORDER THAT TRAFFIC EDUCATION EFFORTS ARE NOT IMPEDED OR BECOME INEFFECTIVE AS A RESULT OF NEGATIVE STUDENT ATTITUDES; FURTHER IMPROVING THE LEGAL REQUIREMENTS FOR THE PROFESSION OF DRIVING INSTRUCTOR; AND DEVELOPING A CONCEPT OF DRIVER LICENSING EXAMINATION TO INCLUDE APPLICANT BEHAVIORAL CHARACTERISTICS.

by HELLMUT LAMSZUS
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1977; 18P 5REFS
TEXT ALSO IN GERMAN.
Availability: TECHTRAN CORP., P.O. BOX 729, GLEN BURNIE, MD.

HS-022 508

SYSTEM ORIENTED STRATEGY IN ACCIDENT RESEARCH (SYSTEMORIENTIERTE STRATEGIE IN DER UNFALLFORSCHUNG)

SYSTEMS ANALYSIS FOR TRAFFIC ACCIDENT RESEARCH INVOLVES BOTH ONE-DIMENSIONAL AND MULTIDIMENSIONAL ELEMENTS. IN THE ONE-DIMENSIONAL APPROACH, ONLY ONE ASPECT OF THE TRAFFIC SITUATION IS STUDIED; FOR EXAM-

PLE, ONLY THE EFFECT OF SPEED ON ACCIDENTS IS ANALYZED WHILE OTHER VARIABLES SUCH AS WEATHER CONDITIONS, DRIVER EXPERIENCE, ETC. ARE ELIMINATED OR MAINTAINED CONSTANT. ON THE OTHER HAND, THE MULTIDIMENSIONAL APPROACH IS DIRECTED AT THE STUDY OF COEXISTING VARIABLES WHICH INTERACT. IT IS FELT THAT TRAFFIC SAFETY RESEARCH SHOULD BE DIRECTED EXPRESSLY AT IDENTIFYING TYPICAL INTERACTIONS OF DRIVING CONDITIONS AND DRIVERS AND DETERMINING THEIR RISK POTENTIAL. A RESEARCH STUDY TO PREDICT DRIVER PERFORMANCE IS CITED, AS WELL AS A STUDY WHICH CATEGORIZED ACCIDENTS BY TYPE OF TRAFFIC SITUATION. THE BASIC PRINCIPLES OF SYSTEMS ANALYSIS ARE DESCRIBED AND INCLUDE THE FOLLOWING: DEFINITION OF THE SYSTEM, ITS COMPONENTS AND RELATIONS; DESCRIPTION OF RELEVANT PROPERTIES; PRESENTATION OF OBJECTIVES; ESTABLISHMENT OF INTERESTS AND INTEREST GROUPS; AND FORMULATION AND EVALUATION OF POSSIBLE SOLUTIONS.

by JULIUS MAREK
Publ: ZEITSCHRIFT FUR VERKEHRSSICHERHEIT V23 N3 P88-93, 94 (1977)
1977; 20P 21REFS
TEXT ALSO IN GERMAN.
Availability: TECHTRAN CORP., P.O. BOX 729, GLEN BURNIE, MD.

HS-022 509

BRAKE SYSTEM OF THE NEW SERIES 7 FULL SIZE BMW [BAVARIAN MOTOR WORKS] AUTOMOBILE (BREMSANLAGE DER NEUEN GROSSEN BMW-WAGEN, BAUREIHE 7)

FOR THE FIRST TIME IN A EUROPEAN PASSENGER CAR, THE NEW SERIES 7, FULL-SIZE BMW (BAVARIAN MOTOR WORKS) MODELS INTRODUCE A HYDRAULIC, POWER-ASSISTED BRAKE SYSTEM. A HIGHER SAFETY RATE IS OBTAINED BY THIS SYSTEM, PARTICULARLY WHEN THE ENGINE HAS NOT REACHED ITS OPERATING TEMPERATURE AND/OR IN CASE OF FAILURE OF THE POWER ASSISTANCE. ITS SHORT RESPONSE TIME PROVIDES AN ADVANTAGE IN STOPPING DISTANCE. THIS CHARACTERISTIC REPRESENTS AN IMPORTANT STEP TOWARD A CENTRAL HYDRAULIC SYSTEM FOR THE WHOLE VEHICLE. FURTHER, THIS BRAKE SYSTEM INCLUDES COMPONENTS WHICH GUARANTEE LONGER INSPECTION INTERVALS AND WHICH RESIST EXTREME OPERATING CONDITIONS. THE PERFORMANCE OF THIS BRAKE SYSTEM AFFORDS THE DRIVER A RELAXED, COMFORTABLE RIDE AND CONTRIBUTES TO VEHICLE SAFETY.

by HELMUT GEUPEL
Publ: ATZ AUTOMOBILTECHNISCHE ZEITSCHRIFT V79 N11 P499-500, 503-4 (1977)
1977; 13P
TEXT ALSO IN GERMAN.
Availability: TECHTRAN CORP., P.O. BOX 729, GLEN BURNIE, MD.

HS-022 510

DIGITAL DATA COLLECTION AND PROCESSING IN PEDESTRIAN-VEHICLE ACCIDENT SPECIMENS (DIGITALE MESSDATENAUFNAHME UND -VERARBEITUNG BEI FUSSGANGER--FAHRZEUG-UNFALLEXPERIMENTEN)

MEANS ARE OUTLINED FOR RECORDING AND PROCESSING A GREAT AMOUNT OF PEDESTRIAN/VEHICLE ACCIDENT DATA, THE VOLUME OF WHICH EXCEEDED THE STORAGE CAPACITY OF THE DIGITAL COMPUTER USED BY THE INST. FOR REGIONAL TRANSPORT OF THE BERLIN TECHNICAL UNIV. FOR SIMULATION STUDIES. THE SOLUTION TO THE STORAGE PROBLEM WAS OVERCOME BY THE FOLLOWING TWO PROCEDURES: DIRECT STORAGE OF A PORTION OF THE DATA CHANNELS IN THE DIGITAL COMPUTER AND INTERMEDIATE STORAGE OF THE REMAINING DATA CHANNELS ON ANALOG MAGNETIC TAPE; AND PACKING THE DATA (STORING DATA OF FEWER WORD-LENGTH DIGITS IN A COMPUTER WORD). TWO LOGICALLY COMBINED PROGRAMMING SYSTEMS WERE DEVELOPED FOR RECORDING AND ANALYZING. BOTH PROGRAMMING SYSTEMS SHOW THAT A GREAT AMOUNT OF DATA CAN BE HANDLED WITH SUFFICIENT RESOLUTION EVEN IN A RATHER SMALL COMPUTER BY MEANS OF SUITABLE SOFTWARE.

by VOLKER RICHTER; MARTIN KRAMER
Publ: ATZ AUTOMOBILTECHNISCHE ZEITSCHRIFT V79 N1 P509-10, 513 (1977)
1977; 12P 5REFS
TEXT ALSO IN GERMAN. BASED ON A DISSERTATION SPONSORED BY BERLIN TECHNICAL UNIV. AS A SPECIAL RESEARCH PROJECT.
Availability: TECHTRAN CORP., P.O. BOX 729, GLEN BURNIE, MD.

HS-022 511

MOTOR-CAR ACCIDENTS DURING PREGNANCY

A REVIEW IS MADE OF ACCIDENT/MEDICAL INFORMATION ON 27 CASES WHERE PREGNANT WOMEN WERE INVOLVED IN AUTOMOBILE ACCIDENTS WHICH RESULTED IN THE DEATH OF THE FETUS, IN THE STATE OF VICTORIA AUSTRALIA DURING THE THREE YEARS 1973 TO 1975. THESE ACCIDENTS RESULTED IN FIVE MATERNAL DEATHS AS WELL. SEVERE MATERNAL INJURY ONLY OCCURRED IN WOMEN NOT WEARING SEAT BELTS; HOWEVER, FETAL DEATH MAY WELL HAVE BEEN THE RESULT OF SEATBELT INJURY IN 14 OF THE SUBJECTS. THE MOST COMMON GENITAL-TRACT INJURY WAS PLACENTAL ABRUPTION. HOWEVER, UTERINE RUPTURE WAS OBSERVED IN THREE WOMEN, AND THESE CASES ARE DESCRIBED IN DETAIL. THE WEARING OF SEAT BELTS WOULD THUS APPEAR TO PROTECT THE PREGNANT WOMAN FROM SEVERE EXTRAGENITAL INJURY LIKELY TO CAUSE HER DEATH, BUT MAY WELL INCREASE THE RISK OF PLACENTAL ABRUPTION OR UTERINE RUPTURE.

by R. J. PEPPERELL; E. RUBINSTEIN; I. A. MACISAAC
Publ: MEDICAL JOURNAL OF AUSTRALIA V7 P203-5 (12 FEB 1977)
1977; 6REFS
Availability: SEE PUBLICATION

HS-802 238

MODEL LEGISLATION FOR EMERGENCY MEDICAL SERVICES

THE MAJOR PURPOSE OF THE MODEL LAW IS TO PROVIDE A REFERENCE FOR PREPARING LEGISLATION ESTABLISHING A STATEWIDE EMERGENCY MEDICAL SERVICE (EMS) PROGRAM. IT IS A REVISION OF EMS MODEL LEGISLATION DEVELOPED IN 1972, AND CONTAINS REFERENCE TO BOTH BASIC AND ADVANCED LIFE-SUPPORT PROCEDURES ALONG WITH FEDERAL CRITERIA FOR UNIFORM CARE, SERVICE IDENTITY, AND SYSTEM DEVELOPMENT. AUTHORITY TO ENACT AND ADMINISTER THE EMS PROGRAM ON STATE AND LOCAL LEVELS IS VESTED IN THE APPROPRIATE STATE AGENCY AND PUBLIC OFFICIAL FOR WHICH SOME 24 SPECIFIED GUIDELINES ARE DELINEATED. A STATE EMS ADVISORY COUNCIL IS RECOMMENDED FOR THE PURPOSE OF APPROVING OR DISAPPROVING, ADVISING, AND GENERALLY OVERSEEING THE STATE AGENCY. THIS ADVISORY COUNCIL SHOULD INCLUDE PHYSICIANS AND REPRESENTATIVES FROM FIRE PROTECTION ORGANIZATIONS, LAW ENFORCEMENT AGENCIES, HOSPITALS, AMBULANCE SERVICES, EMERGENCY CARE NURSES, AND EMERGENCY MEDICAL TECHNICIANS. A SIMILAR ADVISORY COUNCIL SHOULD BE CREATED ON A REGIONAL LEVEL TO OVERSEE REGIONAL EMS ENTITIES. ADVANCED LIFE-SUPPORT SERVICES SHOULD BE DEFINED, AUTHORIZED, AND REQUIRED FOR RAPID AND EFFICIENT DELIVERY OF LIFE SUPPORT CARE AT THE SCENE OF THE EMERGENCY AND DURING TRANSPORT. PERSONS PROVIDING EMERGENCY MEDICAL CARE SHOULD BE GRANTED IMMUNITY FROM LIABILITY FOR SERVICES RENDERED OUTSIDE A HOSPITAL EXCEPT IN THE CASE OF LARGE INCONSISTENCIES OR GROSS MISCONDUCT. GENERAL PROVISIONS ARE OUTLINED AT THE END OF THE MODEL LEGISLATION. SOME 32 DEFINITIONS ARE INCLUDED.

NATIONAL HWY. TRAFFIC SAFETY ADMINISTRATION, ENFORCEMENT AND EMERGENCY SERVICES DIV., WASHINGTON, D.C. 20590
1978; 19P
Availability: CORPORATE AUTHOR

HS-802 586

TRAVEL AND CAMPER TRAILER SAFETY

A MANUAL ON TRAVEL AND CAMPER TRAILER SAFETY IS INTENDED FOR THE MILLIONS OF AMERICANS WHO EMBARK ON YEARLY CAMPING TRIPS USING A RECREATIONAL VEHICLE OF SOME TYPE, AND RISK OR EXPERIENCE ACCIDENTS DUE TO IMPROPER OR MISMATCHED EQUIPMENT, IMPROPER LOADING, DRIVING AND HANDLING ERRORS, OR IGNORANCE OF PARTICULAR SAFETY PRECAUTIONS. FUNDAMENTAL RULES OF SAFE TRAILERING INCLUDE READING THE OWNER'S MANUAL; MATCHING EQUIPMENT OF THE TOWING VEHICLE AND TRAILER; INSPECTION AND MAINTENANCE; PROPER HITCHING, LOADING, AND WEIGHT DISTRIBUTION; AND KNOWLEDGE OF HOW TO CONTROL THE TRAILER. A SECTION ON TRAILER HITCHES DESCRIBES CLASSIFICATION OF VARIOUS TYPES AND TIPS ON WHICH TYPE TO CHOOSE. GUIDELINES FOR TRAILER LOADING INCLUDE DETERMINATION OF THE GROSS VEHICLE WEIGHT RATING (GVWR) AND THE GROSS AXLE WEIGHT RATING (GAWR), AS WELL AS INCREASING LOAD-CARRYING CAPACITY AND DETERMINING AND DISTRIBUTING TRAILER LOAD. A SECTION ON BRAKES, SAFETY CHAINS, AND BREAKAWAY SWITCHES HIGHLIGHTS ELECTRIC BRAKES, AUTOMATIC AND MANUAL CONTROLLERS, AND SURGE BRAKES, AS WELL AS TIPS ON BRAKING SYSTEM MAINTENANCE. SAFETY TIPS AND PROCEDURES ARE GIVEN FOR PREDEPARTURE CHECKS AND FOR DRIVING. MAINTENANCE CONSIDERATIONS ARE OUTLINED FOR TIRES AND WHEELS, AND PROCEDURES FOR REPLACING A FLAT OR BLOWN OUT TIRE ARE DELINEATED. A GLOSSARY OF TERMS IS INCLUDED.

NATIONAL HWY. TRAFFIC SAFETY ADMINISTRATION, WASHINGTON, D.C. 20590
1977; 25P
Availability: CORPORATE AUTHOR

HS-802 873

VEHICLE LIGHTING: A BIBLIOGRAPHY

THIS BIBLIOGRAPHY REPRESENTS LITERATURE ACQUIRED SINCE THE ESTABLISHMENT OF THE NATIONAL HWY. TRAFFIC SAFETY ADMINISTRATION (NHTSA) THROUGH MAY 1977 AS RELATED TO THE LIGHTING OF MOTOR VEHICLES ON THE HIGHWAY. IT IS COMPRISED OF NHTSA CONTRACT REPORTS, REPORTS OF OTHER ORGANIZATIONS CONCERNED WITH HIGHWAY SAFETY, AND ARTICLES FROM PERIODICALS IN RELATED FIELDS. CITATIONS FOLLOW THE FORMAT USED IN THE MONTHLY ABSTRACT JOURNAL, HIGHWAY SAFETY LITERATURE, AND ARE INDEXED BY A KEY-WORD-OUT-OF-CONTEXT (KWOC) LISTING, AUTHOR, CORPORATE AUTHOR, CONTRACT NUMBER, AND REPORT NUMBER.

by LOIS FLYNN, COMP.
NATIONAL HWY. TRAFFIC SAFETY ADMINISTRATION, TECHNICAL REFERENCE DIV., WASHINGTON, D.C. 20590
Rept. No. SB-23; 1977; 214P REFS
Availability: NTIS

HS-802 875

ROLLOVER ACCIDENTS; A BIBLIOGRAPHY

THIS BIBLIOGRAPHY REPRESENTS LITERATURE ACQUIRED SINCE THE ESTABLISHMENT OF THE NATIONAL HWY. TRAFFIC SAFETY ADMINISTRATION (NHTSA) CONCERNING MOTOR VEHICLES INVOLVED IN ROLLOVER ACCIDENTS. MATERIAL ANNOUNCED THROUGH MAY 1977 IS INCLUDED. IT IS COMPRISED OF NHTSA CONTRACT REPORTS, REPORTS OF OTHER ORGANIZATIONS CONCERNED WITH HIGHWAY SAFETY, AND ARTICLES FROM PERIODICALS IN RELATED FIELDS. CITATIONS FOLLOW THE FORMAT USED IN THE MONTHLY ABSTRACT JOURNAL,

AUTHOR, CORPORATE AUTHOR, CONTRACT NUMBER, AND REPORT NUMBER.

by LOIS FLYNN, COMP.
NATIONAL HWY. TRAFFIC SAFETY ADMINISTRATION, TECHNICAL REFERENCE DIV., WASHINGTON, D.C. 20590
Rept. No. SB-24; 1977; 112P REFS
Availability: NTIS

HS-803 031

TRAINING PROGRAM FOR DRIVER LICENSING SCREENING FOR MEDICAL IMPAIRMENT. FINAL REPORT

A COMPLETE CURRICULUM PACKAGE HAS BEEN DEVELOPED FOR TRAINING MOTOR VEHICLE LICENSE EXAMINERS TO IDENTIFY INDIVIDUALS WITH POTENTIALLY UNSAFE PHYSICAL OR MENTAL CONDITIONS. INVESTIGATION OF THE MEDICAL SCREENING METHODS EMPLOYED BY DEPARTMENTS OF MOTOR VEHICLES IN VARIOUS STATES REVEALED THAT THE TASK WAS NOT BEING PERFORMED ACCORDING TO ANY STANDARD OBJECTIVE METHODOLOGY IN ANY STATE. THEREFORE, A LIST OF 51 SIGNS AND SYMPTOMS WAS COMPILED FOR USE BY LAYMEN DRIVER LICENSE EXAMINERS. A MEDICAL EVALUATION CHECKLIST WAS DEVISED TO AID IN DECIDING WHEN APPLICANTS SHOULD BE REFERRED FOR MEDICAL EXAMINATION. THE TOTAL COURSE CONSISTS OF 13 UNITS OF INSTRUCTION: SEVEN UNITS ARE MEDICAL AND SIX UNITS ARE TASK-RELATED. COURSE MATERIALS INCLUDE A COURSE GUIDE, INSTRUCTOR LESSON PLANS, AND A STUDENT STUDY GUIDE. PILOT TESTING WAS CONDUCTED FOR 17 TRAINEES IN MADISON, WIS. THE GAIN RESULTING FROM TRAINING WAS SEVEN RIGHT ANSWERS OF A TOTAL 35 QUESTIONS ON THE COURSE EVALUATION INSTRUMENT. FURTHER STUDY IS RECOMMENDED TO DETERMINE WHETHER ADMINISTRATION OF THIS COURSE INCREASES THE NUMBER OF MEDICAL REFERRALS BY EXAMINERS WHILE DECREASING OR HOLDING CONSTANT THE NUMBER OF INAPPROPRIATE MEDICAL REFERRALS. A SECOND PART OF THE REPORT DESCRIBES DEVELOPMENT OF CURRICULUM MATERIALS DESIGNED TO COMBAT THE PROBLEM OF FALSE IDENTIFICATION DOCUMENTS PRESENTED BY APPLICANTS FOR OPERATORS' LICENSES. COURSE MATERIALS TEACH DRIVER EXAMINERS TO DETECT IMPOSTERS AND ALTERED OR COUNTERFEIT DOCUMENTS. THE TRAINING PROGRAM FOCUSES ON BUILDING EXPECTATIONS CONCERNING OBSERVABLE CHARACTERISTICS OF GENUINE DOCUMENTS AND OF APPLICANTS WHO ARE WHO THEY CLAIM TO BE. FOUR APPENDICES INCLUDE JOB PERFORMANCE REQUIREMENTS; A COMPLETE GLOSSARY OF SIGNS AND SYMPTONS; A MEDICAL EVALUA-

by ANDREW P. CHENZOFF; SANFORD P. SCHUMACHER; LINDA G. BINSTOCK
INNOVATRIX, INC., BOX 371, INGOMAR, PA. 15127
DOT-HS-6-01337
1977; 65P 57REFS
REPT. FOR 1 APR 1976-31 AUG 1977.
Availability: NTIS

HS-803 160

STATE LAWS ON MOPEDS AND MOTORIZED BICYCLES

STATE LAWS ON REGISTRATION, DRIVER LICENSING, AND HELMET REGULATIONS FOR MOPEDS ARE REVIEWED AS THEY STOOD ON 31 DEC 1976. THE UNIFORM VEHICLE CODE (UVC) DOES NOT PROVIDE AN EXCEPTION TO REGISTRATION REQUIREMENTS FOR MOPEDS OR MOTORIZED BICYCLES. BASED ON REVIEWS OF STATE REGISTRATION REQUIREMENTS AND DEFINITIONS, LAWS OF 42 JURISDICTIONS APPEAR TO REQUIRE REGISTRATION OF MOPEDS AS MOTOR VEHICLES FOR LAWFUL HIGHWAY USE. THE UVC REQUIRES INSURANCE FOR ALL VEHICLES OPERATING ON HIGHWAYS; 23 STATES HAVE ADOPTED INSURANCE LAWS FOR MOPEDS. WHILE THE UVC REQUIRES EVERY REGISTERED MOTOR VEHICLE TO BE INSPECTED PERIODICALLY, 32 STATES ACTUALLY REQUIRE INSPECTION, 23 OF THOSE REQUIRING MOPED INSPECTION. FIVE STATES DO NOT REQUIRE OPERATING LICENSES FOR MOPEDS ALTHOUGH THE UVC REQUIRES EVERY PERSON DRIVING ON A HIGHWAY TO BE LICENSED. WHETHER MOPEDS ARE CONSIDERED TO BE MOTOR VEHICLES HAS BEEN SOMEWHAT UNCLEAR UNTIL RECENTLY IN THE UVC; AND MANY STATE LAWS ARE STILL AMBIGUOUS DUE TO THE FACT THAT MOPEDS CAN BE SELF-PROPELLED OR MOVED SOLELY BY HUMAN POWER. ONLY 28 STATES SPECIFICALLY REQUIRE WEARING OF HELMETS BY MOPED DRIVERS. ACCORDING TO THE UVC MOPED DRIVERS ARE REQUIRED TO COMPLY WITH RULES OF THE ROAD; 47 STATES WHICH CLASSIFY MOPEDS AS VEHICLES FOLLOW THIS REGULATION. TWENTY STATES HAVE ADOPTED SPECIAL RULES OF THE ROAD FOR MOPEDS. EQUIPMENT REGULATIONS HAVE BEEN FORMULATED FOR HEADLIGHTS, TAILLIGHTS, STOP LAMPS, REFLECTORS, BRAKES, HORNS, MIRRORS, MUFFLERS, AND EMISSIONS FOR MOPEDS. A LIST OF CITATIONS TO STATE LAWS IS INCLUDED.

by ART DENIS; EDWARD F. KEARNEY
NATIONAL COM. ON UNIFORM TRAFFIC LAWS AND ORDINANCES, SUITE 430, 1776 MASSACHUSETTS AVE., N.W., WASHINGTON, D.C. 20036
DOT-HS-5-01121
Publ: TRAFFIC LAWS COMMENTARY V7 N1 54P (JAN 1978)
1978
Availability: GPO, STOCK NO. 050-003-00301-8

HS-803 182

DEVELOPMENT OF A STANDARDIZED VEHICLE IDENTIFICATION NUMBER. FINAL REPORT

OBJECTIVE, SYSTEMATIZED INFORMATION WAS DEVELOPED FOR USE BY THE NATIONAL HWY. TRAFFIC SAFETY ADMINISTRATION (NHTSA) TO DECIDE THE MOST ADVISABLE CHARACTERISTICS OF A STANDARDIZED VEHICLE NUMBERING (VIN) SYSTEM FOR VEHICLES THAT TRAVEL ON HIGHWAYS. A SYSTEMS ANALYSIS OF USERS INCLUDES CREATION, USE, TRANSMISSION, NEEDS, AND PROBLEMS. REVIEWS OF HUMAN FACTORS LITERATURE INCLUDE HUMAN FACTORS IN THE USE OF ALPHANUMERIC CODES, FOR AND LEGIBILITY CRITERIA FOR SYMBOL DESIGN IN VIN'S. EXPERIMENTAL COMPARISONS WERE CONDUCTED ON SEVEN ALTERNATIVE VIN'S. MOST ERRORS IN VIN TRANSMISSION RELATE TO LACK OF STANDARDIZATION IN THE VIN, LACK OF STANDARDIZED TRAINING MATERIALS FOR ALL USERS, INSUFFICIENCY OF VERIFICATION PROCESSES, AND POOR PHYSICAL CHARACTERISTICS OF VIN PLATES AND IMPRINTS. VIN USERS ARE CATEGORIZED AS OPERATIONAL, ANALYTICAL, OR MONITORING; EACH HAS DIFFERENT NEEDS. USERS WERE ASKED TO STATE THE ESSENTIAL DATA THEY REQUIRE IN THE VIN AND ALSO TO INDICATE SECONDARY OR DISCRETIONARY DATA. ESSENTIAL SHARED NEEDS WERE FOR, FIRST, ACCESS TO LARGE AND COMPLETE DATA FILES CONTAINING UNIQUE INFORMATION THROUGH THE WMI (WORLD MANUFACTURER), THREE CHARACTERS; AND THE VIS (PRODUCTION YEAR PLUS INDIVIDUAL VEHICLE SEQUENCY NUMBER), EIGHT CHARACTERS. THE SECOND SHARED NEED WAS THE ABILITY TO VERIFY VEHICLES BY LOOKING AT THEM, THROUGH MAKE AND BODY TYPE, TWO CHARACTERS. THE THIRD SHARED NEED WAS FOUND TO BE CONTINGENCY FIELDS FOR TEMPORARY DATA, REQUIRING TWO CHARACTERS. THUS, THE TOTAL REQUIREMENT IS FOR 15 CHARACTERS. APPENDICES PRESENT A SCHEMATIC OF PASSENGER CAR TERMINOLOGY AND EXPERIMENT INSTRUCTIONS.

PLANNING AND HUMAN SYSTEMS, INC., 3301 NEW MEXICO AVE., N.W., WASHINGTON, D.C. 10016
DOT-HS-7-01541
1978; 106P 92REFS
REPT. FOR DEC 1976-OCT 1977.
Availability: NATIONAL HWY. TRAFFIC SAFETY ADMINISTRATION, OFFICE OF DRIVER AND PEDESTRIAN RES., WASHINGTON, D.C. 20590

HS-803 183

FINAL IMPACT ASSESSMENT OF THE AUTOMOTIVE FUEL ECONOMY STANDARDS FOR MODEL YEAR 1981-1984 PASSENGER CARS. TECHNICAL REPORT

AN ASSESSMENT OF THE EFFECT OF FUEL ECONOMY STANDARDS FOR PASSENGER CARS IN MODEL YEARS 1981 TO 1984 INDICATES THE FOLLOWING CHANGES FROM THE BASE STANDARD OF 20 MPG FOR MODEL YEAR 1980: A REDUCTION IN GASOLINE CONSUMPTION OF 1100 GALLONS IN THE LIFETIME OF EACH CAR (100,000 MILES); AN INCREASED RETAIL PRICE OF $195 PER CAR; AND A REDUCED COST FOR GASOLINE OF $640 PER CAR AT PRESENT PRICES, OR TOTAL CONSUMER COSTS REDUCED BY $486. INDUSTRY'S CAPITAL EXPENDITURES ARE EXPECTED TO BE INCREASED BY $3.3 BILLION, AND NEW CAR SALES REDUCED BY 210,000 OR 1.8% OF TOTAL SALES. INDUSTRIAL EMPLOYMENT, AFTER AN INITIAL REDUCTION, IS EXPECTED TO BE INCREASED BY 76,000 JOBS OVER PRESENT LEVELS. AUTOMOBILE MANUFACTURERS WOULD NOT ENCOUNTER SIGNIFICANT DIFFICULTIES IN IMPROVING THE FUEL EFFICIENCY OF THEIR NEW CAR FLEETS; 70% OF THE ESTIMATED CAPITAL REQUIREMENTS ARE A RESULT OF TRANSMISSION IMPROVEMENTS. INCLUDED IN THIS ECONOMY IMPACT ASSESSMENT ARE ASSUMPTIONS AND BASE INFORMATION, SENSITIVITY ANALYSES, MACROECONOMIC IMPACTS (ENERGY AND MATERIALS CONSUMPTION, EMPLOYMENT), AND ALTERNATIVES. A BRIEF DESCRIPTION IS PRESENTED OF THE WHARTON AUTOMOBILE DEMAND MODEL.

NATIONAL HWY. TRAFFIC SAFETY ADMINISTRATION, WASHINGTON, D.C. 20590
1977; 145P 19REFS
Availability: NHTSA

HS-803 184

RULEMAKING SUPPORT PAPER CONCERNING THE 1981-1984 PASSENGER AUTO AVERAGE FUEL ECONOMY STANDARDS

THE DEVELOPMENT AND EVALUATION ARE DESCRIBED OF THREE INDUSTRY-WIDE FUEL ECONOMY SCHEDULES DESIGNATED AS "LOW-RANGE," "MEDIUM-RANGE," AND "HIGH-RANGE." THE SCHEDULES ARE EVALUATED IN THE CONTEXT OF THE MANUFACTURERS' ABILITY TO MAKE THE NECESSARY TECHNOLOGICAL AND MANUFACTURING CHANGES, AND TO FINANCE THESE CHANGES, CONSUMER ACCEPTANCE AND RESULTING INDUSTRY ECONOMICS AND NATIONAL EMPLOYMENT, THE ENVIRONMENTAL QUALITY ATTRIBUTABLE TO NEW ALTERNATIVE ENGINES, AND THE AMOUNT OF FUEL ACTUALLY SAVED. THE STATUTORY CRITERIA FOR EVALUATION OF FUEL ECONOMY SCHEDULES INCLUDE TECHNICAL AND ECONOMIC FEASIBILITY, THE EFFECT OF OTHER MOTOR VEHICLE STANDARDS, AND THE NEED OF THE NATION TO CONSERVE ENERGY. A STATUTORY PROVISION FOR "STEADY PROGRESS" TOWARD FUEL ECONOMY ALSO GOVERNS THE SCHEDULES. AMONG THE OTHER MOTOR VEHICLE STANDARDS AFFECTING FUEL ECONOMY ARE THOSE FOR EMISSIONS, SAFETY, NOISE, AND DAMAGEABILITY. THE PROCESS IS OUTLINED FOR DETERMINING THE FEASIBLE AVERAGE FUEL ECONOMY, WITH ALLOWANCES FOR THE EFFECT OF WEIGHT, MINIMUM PERFORMANCE, AND TECHNICAL IMPROVEMENTS. CAPITAL REQUIREMENTS AND COSTS TO THE MANUFACTURER AND CONSUMER ARE OUTLINED, AS WELL AS COSTS TO THE NATIONAL ECONOMY, IN-

CLUDING MATERIALS CONSUMPTION, PETROLEUM CONSERVATION, AND BALANCE OF PAYMENTS.

NATIONAL HWY. TRAFFIC SAFETY ADMINISTRATION, WASHINGTON, D.C. 20590
1977; 127P REFS
Availability: NHTSA

HS-803 185

PROPOSED RULEMAKING CONCERNING PASSENGER AUTOMOTIVE AVERAGE FUEL ECONOMY. FINAL ENVIRONMENTAL IMPACT STATEMENT. TECHNICAL REPORT

THE ENVIRONMENTAL IMPACT OF PASSENGER AUTOMOBILE FUEL ECONOMY STANDARDS FOR MODEL YEARS 1981 THROUGH 1984 AND BEYOND IS REVIEWED, INCLUDING AN ANALYSIS OF ENVIRONMENTAL EFFECTS OF STANDARDS ON MATERIAL SUBSTITUTION, DIESEL ENGINES, NOISE, WATER USAGE, AIR QUALITY, AND SOLID WASTE. AVERAGE FUEL ECONOMY STANDARDS FOR PASSENGER AUTOMOBILES MANUFACTURED IN EACH OF THE MODEL YEARS 1981 THROUGH 1984 ARE: 22 MILES PER GALLON (MPG) FOR 1981; 21 MPG FOR 1982; 26 MPG FOR 1983; AND 27 MPG FOR 1984. THE BASELINE FUEL ECONOMY FROM WHICH FUEL SAVINGS ARE CALCULATED IS 20.0 MPG, WHICH IS THE STATUTORILY PRESCRIBED 1980 FUEL ECONOMY STANDARD. THE SAME BASE IS ALSO USED FOR MEASURING CHANGES IN NATURAL RESOURCES. THE ENVIRONMENTAL PROTECTION AGENCY (EPA) EXPECTS THAT THE SAVINGS IN GASOLINE BY 1984 WILL RANGE FROM 240,000 TO 460,000 BARRELS PER DAY. THE PROJECTED CUMULATIVE SAVINGS FOR THE 20 YEAR PERIOD OF 1981 THROUGH 2000 RANGES FROM 4.5 TO 8.2 BILLION BARRELS. THE EPA ESTIMATES THAT IT WILL REQUIRE ABOUT 1.12 BTU'S LESS IN ENERGY PER VEHICLE TO MANUFACTURE THE MORE FUEL EFFICIENT CARS, DUE TO THE REDUCED AMOUNT OF MATERIALS USED IN THE MANUFACTURE OF THESE MODELS. BASED ON AN ANALYSIS OF MANUFACTURER'S SUBMISSIONS, IT IS ESTIMATED THAT A REDUCTION IN THE USE OF CAST IRON AND STEEL WILL AVERAGE 400 POUNDS PER VEHICLE OR 4.7 BILLION POUNDS NATIONALLY. IT IS ESTIMATED THAT ALUMINUM USAGE WILL INCREASE BY 456 MILLION POUNDS COMPARED TO THE ANNUAL CONSUMPTION OF 9.6 BILLION POUNDS IN 1975. A REDUCTION IN STATIONARY SOURCE AIR POLLUTION IS ANTICIPATED, ALONG WITH AN INCREASE IN SOLID WASTE PROBLEMS INVOLVING PLASTIC AUTOMOTIVE COMPONENTS. THE STATEMENT ITSELF IS DIVIDED INTO NINE SECTIONS: BACKGROUND, ENVIRONMENTAL IMPACT; SIX ALTERNATIVES TO THE ACTION; PROBABLE ADVERSE ENVIRONMENTAL EFFECTS; AND IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES. OTHER SECTIONS ARE SHORT-TERM USES OF THE ENVIRONMENT VERSUS LONGTERM PRODUCTIVITY; INTERESTS AND CONSIDERATIONS OF POLICY THOUGHT TO OFFSET ADVERSE ENVIRONMENTAL EFFECTS; COMMENTS ON THE DRAFT; AND DATA SOURCES. AN APPENDIX INCLUDES BACKGROUND AND TABULATED INFORMATION.

by JOHN M. MACHEY
NATIONAL HWY. TRAFFIC SAFETY ADMINISTRATION, OFFICE OF AUTOMOTIVE FUEL ECONOMY, 400 7TH ST., S.W., WASHINGTON, D.C. 20590
1977; 105P 27REFS
Availability: CORPORATE AUTHOR

HS-803 190

SAFETY RELATED RECALL CAMPAIGNS FOR MOTOR VEHICLES AND MOTOR VEHICLE EQUIPMENT, INCLUDING TIRES, REPORTED TO THE NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION BY DOMESTIC AND FOREIGN VEHICLE MANUFACTURERS, JULY 1, 1977 TO SEPTEMBER 30, 1977

THIS TABULATION OF SAFETY DEFECT RECALL CAMPAIGNS INCLUDES THE NATIONAL HWY. TRAFFIC SAFETY ADMINISTRATION (NHTSA) IDENTIFICATION NUMBER, DATE OF COMPANY NOTIFICATION, MAKE, MODEL, MODEL YEAR, BRIEF DESCRIPTION OF DEFECT AND MANUFACTURER'S CORRECTIVE ACTION, NUMBER OF PAGES ON FILE, AND NUMBER OF VEHICLES RECALLED. BUSES, AUTOMOBILES, TRUCKS, MOTOR HOMES, TRAILERS, SNOWMOBILE TRAILERS, TRACTORS, SCHOOL BUSES, GAS VALVES, CARTRIDGE SHAFTS, SNOWPLOWS, HUBS, AND TIRES ARE INCLUDED. THE STATUS OF DOMESTIC AND FOREIGN CAMPAIGNS COMPLETED AS OF 30 JUN 1977 IS ALSO GIVEN.

NATIONAL HWY. TRAFFIC SAFETY ADMINISTRATION, WASHINGTON, D.C. 20590
1977; 47P
Availability: GPO

HS-803 205

SAFETY RELATED RECALL CAMPAIGNS FOR MOTOR VEHICLES AND MOTOR VEHICLE EQUIPMENT, INCLUDING TIRES. DETAILED REPORTS FROM APRIL 1, 1977 TO JUNE 30, 1977

DETAILED INFORMATION IS PRESENTED CONCERNING DEFECT RECALL CAMPAIGNS CONDUCTED BY DOMESTIC AND FOREIGN AUTOMOBILE AND EQUIPMENT MANUFACTURERS DURING THE SECOND QUARTER OF 1977. RECALL CAMPAIGNS WERE CONDUCTED BY ALL FOUR OF THE MAJOR DOMESTIC AUTOMOBILE MANUFACTURERS. IN MOST CASES THERE WAS MORE THAN ONE CAMPAIGN. NINE DOMESTIC MANUFACTURERS OF MOTOR HOMES OR TRAVEL TRAILERS CONDUCTED RECALL CAMPAIGNS, AND SEVEN TRUCK/TRAILER MANUFACTURERS. ONE DOMESTIC BUS MANUFACTURER AND ONE MAKER OF POSTAL DELIVERY VEHICLES ISSUED RECALLS. NINE FOREIGN AUTOMOBILE MANUFACTURERS LAUNCHED RECALL CAMPAIGNS, AS WELL AS ONE MANUFACTURER OF BUSES AND ONE OF MOPEDS. MOST OF THE EQUIPMENT ITEMS RECALLED WERE TIRES OR MOTORCYCLE HELMETS. THERE WAS A RECALL OF WINDOW GLASS

MOUNTED IN MANY JAPANESE VEHICLES AND OF ONE FURNACE DESIGNED FOR MOTOR HOMES. TYPICAL DOCUMENTS REPRODUCED INCLUDE COPIES OF THE MANUFACTURERS' LETTERS OF NOTIFICATION TO NHTSA THAT A DEFECT WAS FOUND TO EXIST, AND COPIES OF THE NOTICE FORMS, AS WELL AS INFORMATION TO DEALERS, INCLUDING LISTS OF VEHICLE IDENTIFICATION NUMBERS OF AFFECTED VEHICLES (WHERE APPLICABLE). ALSO INCLUDED ARE DIAGNOSIS AND REPAIR BULLETINS AND COPIES OF RECALL NOTICES SENT TO OWNERS.

1977; 754P
Availability: NTIS

HS-803 210

COMPUTER SIMULATION OF HUMAN THORACIC SKELETAL RESPONSE. FINAL REPORT. VOL. 2, THORAX PROGRAMMER'S AND USER'S MANUAL

THE THORAX COMPUTER PROGRAM HAS BEEN DEMONSTRATED, BY FAVORABLE COMPARISON WITH EXPERIMENTAL DATA DEVELOPED ELSEWHERE, TO PREDICT DYNAMIC STRUCTURAL RESPONSES AND RIB FRACTURES FOR THE HUMAN CADAVER. TECHNIQUES ARE SELECTED TO SIMULATE RIB FRACTURE, RESTRAINT SYSTEMS, AND EXPERIMENTAL CONSTRAINTS AND FIVE SIMULATIONS ARE MADE OF ACTUAL CADAVER EXPERIMENTS: THREE WITH IMPACTORS, ONE WITH BELT RESTRAINTS, AND ONE WITH AN AIRBAG EQUIPPED, ENERGY ABSORBING STEERING COLUMN. DOCUMENTATION OF THE COMPUTER PROGRAM THORAX IS PROVIDED, INCLUDING FLOW CHARTS OUTLINING THE TWO MAJOR SUBROUTINES: INPUT, WHICH GENERATES THE NECESSARY GEOMETRIC DATA AND ELEMENT CONNECTIVITIES FOR THE SUBSEQUENT RUN OF DYNAMIC RESPONSES, AND ELPL, THE MAIN PROGRAM FOR PERFORMING DYNAMICAL ANALYSIS. THE USER'S INPUT MAP IS PROVIDED, WITH SAMPLE INPUTS AND CORRESPONDING OUTPUTS. THE PURPOSE AND FUNCTION OF THE LOGICAL UNITS ARE EXPLAINED AND ALL SUBROUTINES LISTED. A SMALL COMPUTER PROGRAM, CONTCT, IS SHOWN FOR DETERMINING THE CONTACT NODES BETWEEN THORAX AND SHOULDER HARNESS.

by H. C. TSAI; M. M. REDDI
FRANKLIN INST. RES. LABS., 20TH AND RACE STREETS, PHILADELPHIA, PA. 19103
DOT-HS-5-01180
1977; 581P
Availability: NTIS

HS-803 216

SPECIAL ADJUDICATION FOR ENFORCEMENT (SAFE). FINAL REPORT

THE SPECIAL ADJUDICATION FOR ENFORCEMENT (SAFE) PROJECT IS DESCRIBED, A PROGRAM DESIGNED TO TEST THE IMPACT OF AN INFORMAL HEARING SYSTEM COMBINED WITH REHABILITA-

JUDICIAL OFFICERS OF THE MUNICIPAL COURT, HEARD TRAFFIC INFRACTION CASES, ACCEPTED GUILTY PLEAS, LISTENED TO MITIGATING CIRCUMSTANCES, AND SENTENCED DEFENDANTS ACCORDING TO THEIR BEST JUDGMENTS OR FOLLOWED A COMPLEX EVALUATION DESIGN WHICH INCLUDED PREDETERMINED SENTENCES FOR ONE-THIRD OF THE DEFENDANTS, AND RANDOMLY SELECTED 10% OF THE SAFE ELIGIBLE CASES TO APPEAR IN FORMAL COURT AND 5% WHO WERE PERMITTED TO FORFEIT BAIL. HEARINGS WERE INFORMAL, WITHOUT POLICE OFFICERS OR PROSECUTOR'S STAFF. DEFENDANTS COULD BRING WITNESSES OR AN ATTORNEY IF THEY DESIRED. MAGISTRATES COULD REFER DEFENDANTS DIRECTLY TO CERTAIN RETRAINING PROGRAMS OR REFER TO ON-SITE DRIVER IMPROVEMENT ANALYSTS OF THE DEPARTMENT OF MOTOR VEHICLES. IMMEDIATE ACCESS TO STATE DRIVING RECORDS FOR SENTENCING PURPOSES WAS MADE POSSIBLE THROUGH THE USE OF REMOTE VIDEO TERMINALS LINKED DIRECTLY TO THE DMV'S STATEWIDE COMPUTER SYSTEM. THESE PERMITTED RAPID ON-SITE DRIVER RECORD UPDATING. EVALUATION BASED ON 21 MONTHS OF OPERATIONS HAS INDICATED THAT: PERSONS WHO HAD A SAFE HEARING TOOK LONGER THAN EITHER COURT OR FORFEITURE CASES TO COMMIT ANOTHER TRAFFIC INFRACTION; THE COST PER CASE WAS CONSIDERABLY LESS FOR SAFE THAN FORMAL COURT AND JUST SLIGHTLY MORE THAN BAIL FORFEITURES; THE AMOUNT OF MONETARY FINES DID NOT SHOW ANY DETERRENT EFFECTS ON RECIDIVISM; AND DEFENSIVE DRIVING RETRAINING (DDC) WAS RESPONSIBLE FOR LOWER CITATION AND ACCIDENT RECIDIVISM RATES, WHILE A DMV SPONSORED PROGRAM OF NARRATIVE DRIVING REDUCED CITATION RECIDIVISM.

by DONALD G. MOREHEAD; MICHAEL T. WOOD
STATE OF WASHINGTON DEPT. OF MOTOR VEHICLES, OLYMPIA, WASH. 98504
DOT-HS-343-3-682
1976; 303P 22REFS
REPT. FOR JUL 1973-DEC 1976.
Availability: NTIS

HS-803 221

VISION AND VISIBILITY IN HIGHWAY DRIVING; A BIBLIOGRAPHY

THIS BIBLIOGRAPHY REPRESENTS LITERATURE ACQUIRED SINCE THE ESTABLISHMENT OF THE NATIONAL HWY. TRAFFIC SAFETY ADMINISTRATION (NHTSA) THROUGH MAY 1977 CONCERNING DRIVER VISION AND VISIBILITY IN HIGHWAY DRIVING. IT IS COMPRISED OF NHTSA CONTRACT REPORTS, REPORTS OF OTHER ORGANIZATIONS CONCERNED WITH HIGHWAY SAFETY, AND ARTICLES FROM PERIODICALS IN RELATED FIELDS. CITATIONS FOLLOW THE FORMAT USED IN THE MONTHLY ABSTRACT JOURNAL, HIGHWAY SAFETY LITERATURE, AND ARE INDEXED BY A KEY-WORD-OUT-OF-CONTEXT (KWOC) LISTING, AUTHOR, CORPORATE

AUTHOR, CONTRACT NUMBER, AND REPORT NUMBER.

by LOIS FLYNN, COMP.
NATIONAL HWY. TRAFFIC SAFETY ADMINISTRATION, TECHNICAL REFERENCE DIV., WASHINGTON, D.C. 20590
Rept. No. SB-26; 1978; 254P REFS
Availability: NTIS

HS-803 222

PASSIVE RESTRAINT SYSTEMS; A BIBLIOGRAPHY

THIS BIBLIOGRAPHY REPRESENTS LITERATURE ACQUIRED SINCE THE ESTABLISHMENT OF THE NATIONAL HWY. TRAFFIC SAFETY ADMINISTRATION (NHTSA) THROUGH MAY 1977 CONCERNING AIR BAG AND PASSIVE RESTRAINT SYSTEMS IN MOTOR VEHICLES. IT IS COMPRISED OF NHTSA CONTRACT REPORTS, REPORTS OF OTHER ORGANIZATIONS CONCERNED WITH HIGHWAY SAFETY, AND ARTICLES FROM PERIODICALS IN RELATED FIELDS. CITATIONS FOLLOW THE FORMAT USED IN THE MONTHLY ABSTRACT JOURNAL, HIGHWAY SAFETY LITERATURE, AND ARE INDEXED BY A KEY-WORD-OUT-OF-CONTEXT (KWOC) LISTING, AUTHOR, CORPORATE AUTHOR, CONTRACT NUMBER, AND REPORT NUMBER.

by LOIS FLYNN, COMP.
NATIONAL HWY. TRAFFIC SAFETY ADMINISTRATION, TECHNICAL REFERENCE DIV., WASHINGTON, D.C. 20590
Rept. No. SB-25; 1978; 239P REFS
Availability: NTIS

HS-803 233

FLEET ACCIDENT EVALUATION OF [FEDERAL MOTOR VEHICLE SAFETY STANDARD] FMVSS 121. INTERIM REPORT

PRELIMINARY RESULTS ARE PRESENTED, BASED ON THE FIRST YEAR OF THE FLEET MONITORING PROGRAM, TO EVALUATE THE SAFETY IMPACT OF FMVSS 121. MILEAGE, ACCIDENTS, AND BRAKE SYSTEM MAINTENANCE ARE BEING COLLECTED ON A NATIONAL SAMPLE OF VEHICLES. THE FLEETS AND VEHICLES WERE SELECTED FROM MANUFACTURERS' SALES LISTS FOR THE PRODUCTION PERIOD JAN 1974-JAN 1976 USING PROBABILITY-BASED SAMPLING TECHNIQUES. A COMPLETE DESCRIPTION OF THE SAMPLE DESIGN IS INCLUDED. AN IMPORTANT FINDING AT THE MID-POINT OF THE STUDY IS THAT THE SALES OF PRE-STANDARD VEHICLES IN 1974 AND EARLY 1975 INVOLVED PROPORTIONATELY MORE TRACTORS IN LARGE "FOR HIRE" FLEETS, WHILE THE SALES OF POSTSTANDARD VEHICLES IN 1975 AND EARLY 1976 INVOLVED PROPORTIONATELY MORE STRAIGHT TRUCKS IN SMALL PRIVATE FLEETS. THESE DIFFERENCES ARE ADJUSTED FOR IN THE COMPUTATION OF ACCIDENT RATES SINCE THEY DIRECTLY AFFECT THE EXPOSURE OF THE VEHICLES. PRELIMINARY RESULTS INDICATE THAT THE ADJUSTED ACCIDENT RATE IS SLIGHTLY LOWER (19%) FOR THE POSTSTANDARD VEHICLES. HOWEVER, BRAKE SYSTEM MAINTENANCE ON THE POSTSTANDARD VEHICLES OCCURS MORE FREQUENTLY (35%). THESE RESULTS ARE NOT STATISTICALLY SIGNIFICANT. THE FINAL SECTION OF THE REPORT DESCRIBES WORK-IN-PROGRESS, INCLUDING SUPPLEMENTAL DATA COLLECTION ON INJURY AND FATAL ACCIDENTS, AND RECENT MODIFICATIONS OF THE FLEET MONITORING PROGRAM TO ALLOW FOR THE COLLECTION OF ADDITIONAL BRAKE SYSTEM MAINTENANCE DATA ON THE PRESTANDARD VEHICLES AND THE ADDITION OF POST-NOTICE 7 VEHICLES.

by KENNETH L. CAMPBELL; ARTHUR C. WOLFE
UNIVERSITY OF MICHIGAN, HWY. SAFETY RES. INST., ANN ARBOR, MICH. 48109
DOT-HS-6-01286
Rept. No. UM-HSRI-77-35; 1977; 226P
Availability: NTIS

HS-803 234

THE TRACTION GENERATING POTENTIAL OF SNOW TIRES VS. REGULAR TREAD TIRES ON ICE, SNOW, WET, AND DRY SURFACES. TECHNICAL REPORT

OFTEN-ASKED QUESTIONS REGARDING THE USE OF REGULAR TREAD TIRES VERSUS SNOW TREAD TIRES UNDER VARIOUS ENVIRONMENTAL CONDITIONS ARE EXAMINED BY MEASURING TRACTIVE PERFORMANCE OF THE TWO TYPES OF TIRES IN ACCELERATION, BRAKING, AND CORNERING ON A VARIETY OF SURFACE CONDITIONS INCLUDING ICE, SNOW, AND WET AND DRY CONCRETE USING AN INSTRUMENTED VEHICLE AND THE MOBILE TIRE TRACTION DYNAMOMETER (MTTD). SOME 21 TIRES CLASSIFIED IN SIX CATEGORIES WERE TESTED. PERFORMANCE MEASURES INCLUDED PEAK BRAKING, SLIDE BRAKING, PEAK ACCELERATION, SLIDE ACCELERATION, AND PEAK CORNERING. RESULTS INDICATE THAT SNOW TREADS ARE SUPERIOR TO REGULAR TREADS ON SNOW AND ICE. ON WET CONCRETE THERE IS NO DIFFERENCE IN TRACTIVE PERFORMANCE BUT ON DRY SURFACES SNOW TREADS GENERATE LOWER TRACTIVE FORCES THAN REGULAR TREADS. SNOW TIRES GENERALLY PERFORM BETTER THAN REGULAR TREAD TIRES DESIGNATED AS SNOW TIRES. AN APPENDIX DESCRIBES THE MTTD.

by A. H. NEILL, JR.; A. KONDO; J. HINCH; P. L. BOYD
NATIONAL HWY. TRAFFIC SAFETY ADMINISTRATION, SAFETY RES. LAB., 6501 LAFAYETTE AVE., BLDG., 2, RIVERDALE, MD. 20840
1978; 44P 1REF
Availability: NTIS

HS-803 235

GUIDE TO MOTOR VEHICLE TITLING AND REGISTRATION TERMINOLOGY. FINAL REPORT

SOME 43 TERMS PARTICULARLY RELATED TO MOTOR VEHICLE TITLING AND REGISTRATION ARE LISTED AND DEFINED. STATE MOTOR VEHICLE CODES WERE RESEARCHED TO DISCOVER SUCH

TERMS AND DEFINITIONS, AS WELL AS VARIATIONS AND COMMONALITIES. IN MOST INSTANCES, STATES HAVING THE GREATEST COMMONALITY OF DEFINITION ARE LISTED. DEFINITIONS ESTABLISHED BY THE UNIFORM VEHICLE CODE, AS WELL AS DEFINITIONS ESTABLISHED BY THE NATIONAL HWY. TRAFFIC SAFETY ADMINISTRATION IN THE FEDERAL MOTOR VEHICLE SAFETY STANDARDS ARE SHOWN FOR EACH TERM LISTED. TERMS ARE LISTED IN ALPHABETICAL ORDER, EACH INCLUDING DEFINITION, ANNOTATION, SEE ALSO, AND NOTES. AN APPENDIX LISTS STATE MOTOR VEHICLE STATUTES. AN INDEX LISTS EACH TERM AND CROSS-REFERENCES THE TERM TO OTHER CLOSELY RELATED TERMS.

by ROBERT WHITCOMB
ARTHUR YOUNG AND CO., 1025 CONNECTICUT AVE., N.W., WASHINGTON, D.C. 20036
CONTRACT DOT-HS-6-01425
1977; 98P 3REFS
REPT. FOR JUL 1976-MAY 1977.
Availability: NTIS

HS-803 236

GUIDELINES MANUAL. VEHICLE THEFT COUNTERMEASURES IN THE ISSUANCE OF CERTIFICATES OF VEHICLE TITLE. FINAL REPORT

THIS REPORT DEFINES ELEMENTS OF THE VEHICLE TITLING/REGISTRATION PROCESSES OF STATE DEPARTMENTS OF MOTOR VEHICLES THAT ARE PARTICULARLY VULNERABLE TO ATTEMPTS TO ACQUIRE "LEGAL" TITLE TO STOLEN VEHICLES. ELEVEN PROCEDURAL GUIDELINES ARE RECOMMENDED WHICH SUPPORT A COMPREHENSIVE MOTOR VEHICLE TITLING PROGRAM DIRECTED TOWARD THE DETECTION OF STOLEN VEHICLES AND MAINTENANCE OF THE INTEGRITY OF THE TITLE AND REGISTRATION PROCESS. THESE ELEVEN COUNTERMEASURES ARE ARRANGED FOR DISCUSSION BY RECOMMENDED POLICY, PERCEIVED SYSTEM WEAKNESS, AND RECOMMENDED PROCEDURAL GUIDELINES. THE PROBLEM OF MOTOR VEHICLE THEFTS HAS INCREASED SIGNIFICANTLY DURING THE 1970'S, WITH REPORTED THEFTS IN 1975 AT MORE THAN 900,000. APPROXIMATELY 30% OF STOLEN MOTOR VEHICLES ARE NEVER LOCATED OR RECOVERED. THERE IS AMPLE EVIDENCE THAT LARGE NUMBERS OF STOLEN VEHICLES ANNUALLY RECEIVE A FALSE IDENTITY AND ARE UNDETECTED IN THE TITLE REVIEW PROCESS. LEGITIMATE AND STATE APPROVED TITLES TO STOLEN VEHICLES CAN MOST OFTEN BE OBTAINED AS A RESULT OF ALLOWANCE FOR TITLE BY MAIL; FRAUDULENT USE OF OFFICIAL DOCUMENTS; AND ALLOWANCE FOR TITLES ISSUED WITHOUT ANY INSPECTION OR VERIFICATION. RECOMMENDED PROCEDURAL GUIDELINES INCLUDE TITLE DOCUMENT INSPECTION; UNIFORM CERTIFICATE OF TITLE; TRAINING FOR DOCUMENT INTAKE; AND VERIFICATION OF FOREIGN TITLES. OTHER PROPOSED PROCEDURES ARE CONFIRMATION OF VALID TITLE; PHYSICAL EXAMINATION OF VEHICLES; VEHICLE IDENTIFICATION NUMBER ASSIGNMENT; AND SALVAGE VEHICLE AND DOCUMENT CONTROL. PROCEDURES ALSO APPLY TO AUTOMOBILE WRECKERS, DISMANTLERS, AND RELATED BUSINESSES; UNIFORM VEHICLE IDENTIFICATION NUMBER (VIN); AND SALVAGE VEHICLE OWNERSHIP.

by MICHAEL DIMICELI; HUGO B. BECKER
ARTHUR YOUNG AND CO., 1025 CONNECTICUT AVE., N.W., WASHINGTON, D.C. 20036
DOT-HS-6-01425
1977; 43P 36REFS
REPT. FOR JUL 1976-AUG 1977.
Availability: NTIS

HS-803 237

MULTIDISCIPLINARY ACCIDENT INVESTIGATION. SCHOOL BUS LOCOMOTIVE-CABOOSE COLLISION. MDAI TEAM REPORT

THE TRAIN VERSUS SCHOOL BUS COLLISION OCCURRED IN LAFAYETTE, OREG., ON 8 SEP 1976. THE COLLISION OCCURRED WHEN THE SCHOOL BUS STOPPED AT A STOP SIGN POSTED AT THE TRACKS, THEN PROCEEDED ACROSS THE TRACKS DIRECTLY INTO THE PATH OF AN ONCOMING LOCOMOTIVE-CABOOSE COMBINATION. THE COLLISION WAS APPARENTLY CAUSED BY IMPROPER VISUAL SEARCH OF THE TRACKS BY THE BUS DRIVER, BUT ENVIRONMENTAL FACTORS DECREASED THE PRE-CRASH CONSPICUITY OF THE TRAIN. THE IMPACT CAUSED THE BUS TO TILT TO THE RIGHT; THE TRAIN THEN ROTATED THE BUS ABOUT ITS REAR WHEELS AND DRAGGED THE BUS 30 FEET. THE BUS ROTATED BEYOND 90° UNTIL THE RIGHT REAR STRUCK THE LEFT SIDE OF THE LOCOMOTIVE, CAUSING THREE FATAL INJURIES. THE BUS THEN ROLLED UPRIGHT AND ON ITS WHEELS 300 FEET, COMING TO REST WHEN IT COLLIDED WITH A WOODEN GARAGE. NO EJECTIONS OCCURRED. ALL THREE FATALITIES AND MANY OF THE MORE SEVERE INJURIES RESULTED FROM THE SECONDARY IMPACT OF THE RIGHT REAR BUS AGAINST THE LEFT SIDE OF THE TRAIN.

by E. E. FLAMBOE; J. OUELETT
UNIVERSITY OF SOUTHERN CALIFORNIA, INST. OF SAFETY AND SYSTEMS MANAGEMENT, LOS ANGELES, CALIF. 90007
1977; 140P REFS
SPONSORED BY NATIONAL HWY. TRAFFIC SAFETY ADMINISTRATION.
Availability: NTIS

HS-803 244

THE UTILITY OF PERIPHERAL VISION TO MOTOR VEHICLE DRIVERS. FINAL REPORT

THE DETERMINATION WAS MADE OF THE FREQUENCY OF MIRROR USAGE BY SUBJECTS IN TRAFFIC MANEUVERS USING THEIR OWN CARS AND THE ASSOCIATED EXTENT OF HEAD TURN DURING MIRROR USAGE. THE STUDY INCLUDED THE MEASUREMENT OF PERIPHERAL DETECTION ANGLES (PDA) AS A FUNCTION OF TARGET CONTRAST, TARGET SPEED, FOVEAL ATTENTIONAL LOAD, EYE AND HEAD POSI-

YIELDED 4400 MIRROR SAMPLES AND ASSOCIATED HEAD MOVEMENTS. IT WAS CONCLUDED THAT GREATER HEAD MOVEMENT IS ASSOCIATED WITH THE LEFT MIRROR COMPARED TO THE INSIDE MIRROR (37° VERSUS 22°). THE PERCENT HEAD TURN (DEGREE HEAD TURN/DEGREES TO MIRROR) WAS 65% FOR THE OUTSIDE MIRROR VERSUS 50% FOR THE INSIDE MIRROR. AGE DIFFERENCES WERE SIGNIFICANT, WITH OLDER SUBJECTS EXHIBITING GREATER HEAD MOVEMENT FOR BOTH MIRRORS. IN TASK 2 WITH OVER 35 SUBJECTS STUDIED, THE OVERALL PDA WAS NEARLY EQUAL TO 86° WITH DIFFERENCES ASSOCIATED WITH AGE, TARGET SPEED, EYE POSITION, AND FOVEAL LOAD. TASK 3 FIELD STUDIES GENERALLY VALIDATED THE LAB RESULTS AND INDICATED DISCRIMINATION WAS 5° LESS THAN PURE DETECTION. RESULTS SUGGEST THAT DESIGNERS MUST USE AN "EFFECTIVE PDA" BASED ON TARGET RELATIVE VELOCITY AND EFFECTIVE REACTION AND DECISION TIME.

by THOMAS H. ROCKWELL; K. N. BALASUBRAMANIAN; TOM KRETOVICS; EILEEN J. WILFONG
OHIO STATE UNIV., DEPT. OF INDUSTRIAL AND SYSTEMS ENGINEERING, COLUMBUS, OHIO 43210
DOT-HS-5-01203
1977; 253P REFS
REPT. FOR 23 JUN 1975-1 AUG 1977.
Availability: NTIS

HS-803 245

EVALUATION AND CORRELATION OF DRIVER/VEHICLE DATA. FINAL REPORT. VOL. 1. SUMMARY REPORT

by DAVID H. WEIR; RICHARD J. DIMARCO; DUANE T. MCRUER
SYSTEMS TECHNOLOGY, INC., 13766 S. HAWTHORNE BLVD., HAWTHORNE, CALIF. 90250
DOT-HS-5-01200
Rept. No. TR-1068-1; 1977; 40P 16REFS
FOR ABSTRACT, SEE HS-803 246. REPT. FOR JUN 1975-MAR 1977.
Availability: NTIS

HS-803 246

EVALUATION AND CORRELATION OF DRIVER/VEHICLE DATA. FINAL REPORT. VOL. 2. TECHNICAL REPORT

AVAILABLE HANDLING-RELATED DRIVER/VEHICLE SYSTEM RESPONSE AND PERFORMANCE DATA WERE ANALYZED AND CORRELATED TO IDENTIFY SAFETY-RELEVANT VEHICLE PERFORMANCE CHARACTERISTICS AND REQUIREMENTS CRITERIA. EXPERT AND TYPICAL DRIVER/VEHICLE INTERACTION IN SAFETY-RELATED VEHICLE MANEUVERS WAS STUDIED TO INFER THE STEERING BEHAVIOR OF DRIVERS IN VARIOUS ACCIDENT SCENARIOS AND TO DETERMINE THE INFLUENCE OF VEHICLE FACTORS ON THIS BEHAVIOR. THE DRIVING SITUATIONS TESTED INCLUDE OPEN AND CLOSED LOOP LIMIT MAL REGULATION AND MANEUVER TASKS. KEY VEHICLE PARAMETERS WERE DEFINED AND QUANTIFIED BY MEASUREMENTS OF SYSTEM PERFORMANCE AND BY WORK-LOAD RELATED DRIVER EVALUATIONS. DIRECTIONAL PARAMETERS INCLUDE STEADY STATE STEERING GAIN AND EFFECTIVE YAW TIME CONSTANT. WIDER BOUNDARIES WERE TENTATIVELY NOTED, CORRESPONDING TO UNACCEPTABLE CHARACTERISTICS.

by DAVID H. WEIR; RICHARD J. DIMARCO; DUANE T. MCRUER
SYSTEMS TECHNOLOGY, INC., 13766 S. HAWTHORNE BLVD., HAWTHORNE, CALIF. 90250
DOT-HS-5-01200
Rept. No. TR-1068-1; 1977; 155P 44REFS
SUMMARY REPT. IS HS-803 245. LITERATURE SURVEY IS HS-803 247. REPT. FOR JUN 1975-MAR 1977.
Availability: NTIS

HS-803 247

EVALUATION AND CORRELATION OF DRIVER/VEHICLE DATA. FINAL REPORT. VOL. 3. LITERATURE SURVEY

A SURVEY OF LITERATURE AND OTHER DATA SOURCES IS SUMMARIZED IN CONNECTION WITH THE ANALYSIS AND CORRELATION OF DRIVER/VEHICLE SYSTEMS DATA. CRITERIA FOR DATA CATEGORIES INCLUDE CURRENTLY USEFUL RESULTS OF EXPERIMENTS AND HANDLING TESTS, OBJECTIVE MEASUREMENTS OF HANDLING PERFORMANCE, ATTEMPTS TO RELATE OBJECTIVE AND SUBJECTIVE VEHICLE HANDLING MEASUREMENTS, AND MATERIAL RELATED TO THE OVERALL OBJECTIVES OF THE STUDY. SOURCES OF MATERIAL ARE CATEGORIZED AS NATIONAL HWY. TRAFFIC SAFETY ADMINISTRATION CONTRACT DATA BASES, OTHER DRIVER/VEHICLE RESPONSE AND PERFORMANCE DATA, AND EXPERIMENTAL SAFETY VEHICLE (ESV) AND RESEARCH SAFETY VEHICLE (RSV) TEST RESULTS.

by DAVID H. WEIR
SYSTEMS TECHNOLOGY, INC., 13766 S. HAWTHORNE BLVD., HAWTHORNE, CALIF. 90250
DOT-HS-5-01200
Rept. No. TR-1068-1; 1977; 82P 45REFS
TECHNICAL REPT. IS HS-803 246; SUMMARY REPT. IS HS-803 245. REPT. FOR JUN 1975-MAR 1977.
Availability: NTIS

HS-803 248

EFFECTS OF WEIGHT DISTRIBUTING HITCH TORQUE ON CAR-TRAILER DIRECTIONAL CONTROL AND BRAKING. FINAL REPORT

RESULTS ARE PRESENTED OF A FULL-SCALE TEST PROGRAM WITH SUPPORTING COMPUTER SIMULATION ANALYSIS AIMED AT DETERMINING THE EFFECTS OF WEIGHT-DISTRIBUTING HITCH FORCES, OR TORQUE, ON COMBINATION-VEHICLE (C-V) HANDLING AND BRAKING. TWO C-V CONFIGURATIONS WERE USED; A FULL-SIZED STATION WAGON PLUS

31-FOOT TRAVEL TRAILER, AND A COMPACT SIZED SEDAN PLUS 18-FOOT UTILITY TRAILER. TEST PROCEDURES INCLUDED A STEP STEER FOR TOW VEHICLE UNDERSTEER CHANGES AND TRANSIENT RESPONSE; A PULSE STEER FOR TRAILER SWING MODE DAMPING; STRAIGHT LINE BRAKING FOR STOPPING DISTANCE; AND BRAKING IN A TURN FOR TRANSIENT UNDERSTEER CHANGES. OVER 800 TEST RUNS WERE PERFORMED IN WHICH LOAD LEVELING TORQUE, HITCH LOAD, AND TIRE PRESSURE WERE THE PRIMARY INDEPENDENT VARIABLES. RESULTS SHOW THAT INCREASING HITCH LOAD AND/OR LOAD LEVELING TORQUE DEGRADE THE TOW VEHICLE UNDERSTEER AND REDUCE THE SPEED FOR INCIPIENT JACKKNIFING. ON THE OTHER HAND, TRAILER DAMPING IS SOMEWHAT IMPROVED WITH LOAD LEVELING. FRONT/REAR TIRE PRESSURE DIFFERENTIALS (FRONT LOWER THAN REAR) HAVE A SIGNIFICANT BENEFICIAL INFLUENCE WHEN THE HITCH LOAD IS HIGH SEVERAL DEVICES AND PROCEDURES WERE INVESTIGATED IN ORDER TO PROVIDE THE USER WITH A TECHNIQUE FOR DETERMINING THE LOAD LEVELING TORQUE APPLIED BY A WEIGHT-DISTRIBUTION HITCH. ALL METHODS PROVIDED USABLE RESULTS, THE SIMPLEST BEING MEASUREMENT OF DIFFERENTIAL BUMPER HEIGHT. HOOK-UPS RESULTING IN A SMALL HITCH-LOW ATTITUDE (CORRESPONDING TO 0% HITCH LOAD TRANSFER TO THE FRONT AXLE IN CONVENTIONALLY SPRUNG TOW CARS) ARE MORE DESIRABLE THAN A LEVEL ATTITUDE WHICH PROVIDES APPROXIMATELY 25% HITCH LOAD TRANSFER. SIX APPENDICES PRESENT CAR-TRAILER EQUATIONS OF MOTION; A RUN LOG; DETERMINATION OF TOW CAR AND TRAILER STABILITY FACTORS; STEADY-STATE AND PEAK HITCH ANGLE RESPONSES; AND DERIVATION OF OPTIMUM LOAD LEVELING FOR MINIMUM STOPPING DISTANCE.

by RICHARD H. KLEIN; HENRY T. SZOSTAK
SYSTEMS TECHNOLOGY, INC., 13766 S. HAWTHORNE BLVD., HAWTHORNE, CALIF. 90250
DOT-HS-7-01548
Rept. No. TR-1098-1; 1977; 141P 10REFS
REPT. FOR DEC 1976-SEP 1977.
Availability: NTIS

HS-803 254

AUTOMOBILE CONSUMER INFORMATION STUDY: TITLE II, PUBLIC LAW 92-513. FINAL PHASE 1 TECHNICAL REPORT

RESULTS ARE SUMMARIZED OF THE FIRST PHASE OF A RESEARCH PROGRAM TO DEVELOP CONSUMER INFORMATION ON AUTOMOBILE CRASHWORTHINESS, DAMAGE SUSCEPTIBILITY, EASE OF DIAGNOSIS AND REPAIR, AND INSURANCE COSTS BY VEHICLE MAKE AND MODEL. RESEARCH WAS CONDUCTED IN PART TO ASSESS THE FEASIBILITY OF DEVELOPING A RATING SYSTEM WHICH WOULD PROVIDE RATINGS BY MAKE AND MODEL FOR THREE VEHICLE CHARACTERISTICS: DAMAGE SUSCEPTIBILITY, CRASHWORTHINESS, AND EASE OF DIAGNOSIS AND REPAIR. TWO BASIC METHODOLOGICAL APPROACHES WERE STUDIED: A HISTORICAL RATING METHODOLOGY USING OPERATIONAL FIELD DATA, AND A PREDICTIVE RATING METHODOLOGY USING MANUFACTURER DESIGN DATA AND COMPONENT TEST DATA AS INPUTS TO COMPUTER SIMULATION MODELS. A SERIES OF CRASH TESTS USING INSTRUMENTED DUMMIES WAS PERFORMED TO COLLECT DATA IN ORDER TO ASSESS THE FEASIBILITY OF PREDICTIVE RATINGS METHODS FOR DAMAGE SUSCEPTIBILITY AND CRASHWORTHINESS. CONSUMER RESEARCH, INFORMATION DISSEMINATION, AND PROGRAM INTEGRATION WERE STUDIED TO DETERMINE WHAT TITLE II INFORMATION CONSUMERS WOULD MOST LIKELY USE AND HOW THIS INFORMATION SHOULD BE PRESENTED TO HAVE THE GREATEST IMPACT. MATHEMATICAL SIMULATION AND DELPHI PANELS OF EXPERTS WERE USED TO ASSESS SOCIOECONOMIC IMPACT OF TITLE II INFORMATION DISSEMINATION ON CONSUMERS. PLANS FOR THE SECOND PHASE OF RESEARCH INCLUDE: COLLECTION AND EVALUATION OF ADDITIONAL HISTORICAL DATA SOURCES; CRASH TESTING AND MATH MODELING TO SUPPORT PREDICTIVE RATINGS FEASIBILITY ANALYSIS; AND ADDITIONAL CONSUMER RESEARCH AND POTENTIALLY A DISSEMINATION OF PRELIMINARY RATINGS TO ASSESS IMPACT OF TITLE II INFORMATION. FIVE APPENDICES INCLUDE OWNERS SURVEY FOR REPAIRABILITY; LITERATURE SURVEY; CONSUMER BUYING FACTORS SURVEY; GROUP DEPTH INTERVIEWS; AND PROPOSED APPROACH TO NATIONAL SURVEY AND ADDITIONAL INTERVIEWS.

BOOZ, ALLEN APPLIED RES., 4733 BETHESDA AVE., BETHESDA, MD. 20014
DOT-HS-4-00904
Rept. No. BA-9073-061-001; 1976; 181P
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Availability: NTIS

HS-803 257

A STUDY OF ADMINISTRATIVE HEARINGS CONDUCTED BY STATE DRIVER LICENSING AGENCIES. FINAL REPORT. VOL. 1

A STUDY OF ADMINISTRATIVE HEARINGS WAS CONDUCTED BY DRIVER LICENSING AGENCIES AS PART OF THEIR PROCEDURES IN WITHDRAWING DRIVERS' LICENSES. CURRENT PRACTICES OF THESE AGENCIES, AS DETERMINED THROUGH A NATIONWIDE SURVEY AND OBSERVATIONS OF SELECTED STATE OPERATIONS, WERE COMPARED WITH THE ANTICIPATED REQUIREMENTS OF DUE PROCESS TO EVALUATE COMPLIANCE WITH THESE LEGAL PRECEPTS. THE FIRST VOLUME CONTAINS THE FINDINGS OF THE RESEARCH, A SUMMARY OF DUE PROCESS REQUIREMENTS, THE EVALUATION FOR PROVISION OF DUE PROCESS, AND RECOMMENDATIONS FOR IMPROVEMENTS. IT WAS FOUND THAT MOST STATES PROVIDE OPPORTUNITIES FOR HEARINGS, BUT SEVERAL DID NOT HOLD HEARING UNTIL AFTER LICENSES WERE WITHDRAWN. NUMEROUS INADEQUACIES WERE CITED IN NOTICE OF LICENSE WITHDRAWAL, SUCH AS INSUFFICIENT INFORMATION ABOUT AN OPPORTUNITY FOR HEARING OR ABOUT DRIVERS' RIGHTS. THERE WAS ALSO A GENERAL LACK OF NOTIFICATION OF THE

REASONS FOR THE FINAL DETERMINATION. THERE WAS SOME LACK OF PROCEDURAL CONCERN WITH DUE PROCESS REQUIREMENTS. PERSONNEL CONDUCTING LICENSE WITHDRAWAL HEARINGS, ALTHOUGH MINIMALLY QUALIFIED, LACK TRAINING IN CONDUCTING TRIAL-TYPE HEARINGS, IN BASIC DUE PROCESS REQUIREMENTS, AND IN PROTECTING INDIVIDUALS' RIGHTS. IT IS RECOMMENDED THAT THESE "TRIAL-TYPE" HEARINGS BE SEPARATED FROM OTHER DRIVER CONTROL PROGRAMS. IT IS ALSO RECOMMENDED THAT DRIVER LICENSING AGENCIES HAVE FULL AUTHORITY AND RESPONSIBILITY TO CONDUCT LICENSING HEARINGS, THAT HEARING RESPONSIBILITIES BE CONSOLIDATED WITHIN THE LICENSING AGENCY, AND THAT A SENIOR LEVEL POSITION EXIST IN EACH AGENCY FOR A FULL-TIME HEARING OFFICER. AMONG THE RECOMMENDED PROCEDURAL CHANGES ARE PROVISION OF OPPORTUNITIES TO BE HEARD IN ALL LICENSE WITHDRAWAL ACTIONS, AND PROCEDURES FOR FORMAL "TRIAL-TYPE" HEARINGS ON CONTESTED CASES. CLARIFICATION OF APPEAL PROCEDURES IS ALSO RECOMMENDED, ESPECIALLY OF ADMINISTRATIVE ASPECTS.

by ROBERT F. WHITCOMB
ARTHUR YOUNG AND CO., 1025 CONNECTICUT AVE., N.W., WASHINGTON, D.C. 20036
DOT-HS-5-01252
1977; 133P
VOL. 2 IS HS-803 258.
Availability: NTIS

HS-803 258

A STUDY OF ADMINISTRATIVE HEARINGS CONDUCTED BY STATE DRIVER LICENSING AGENCIES. FINAL REPORT. VOL. 2

THE APPENDICES ARE PRESENTED OF THE EVALUATION OF LICENSE WITHDRAWAL HEARINGS CONDUCTED BY STATE DRIVER LICENSING AGENCIES IN THE LIGHT OF DUE PROCESS REQUIREMENTS. APPENDIX A AND APPENDIX B INCLUDE THE RESULTS OF THE NATIONWIDE SURVEY OF THE VISITS TO SELECTED STATES, INCLUDING NARRATIVE REPORTS FROM THE STATES OF FLORIDA, IDAHO, LOUISIANA, NEW YORK, SOUTH CAROLINA, UTAH, WASHINGTON, AND WISCONSIN. APPENDIX C SUMMARIZES RESEARCH OF CASE LAW AND DETERMINATION OF APPLICABLE DUE PROCESS REQUIREMENTS THAT WERE USED IN THE EVALUATION OF CURRENT PRACTICES.

by ROBERT F. WHITCOMB
ARTHUR YOUNG AND CO., 1025 CONNECTICUT AVE., N.W., WASHINGTON, D.C. 20036
DOT-HS-5-01252
1977; 182P REFS
VOL. 1 IS HS-803 257. APPENDIX C CONTAINS THE PAPER WRITTEN BY ROBERT FORCE OF THE TULANE SCHOOL OF LAW, ENTITLED "PROCEDURAL DUE PROCESS REQUIREMENTS IN ADMINISTRATIVE SUSPENSION AND REVOCATION OF DRIVERS' LICENSES."
Availability: NTIS

HS-803 260

DRIVER VISUAL LIMITATIONS DIAGNOSIS AND TREATMENT. FINAL REPORT

THE ROLE OF VISION IN DRIVING WAS EVALUATED, AS WERE THE RELIABILITY AND VALIDITY OF THE MARK II, A PROTOTYPE BATTERY OF EIGHT DRIVING-RELATED VISION TESTS. THE RELATIONSHIP BETWEEN POOR PERFORMANCE ON THE MARK II AND CLINICALLY DIAGNOSED VISUAL IMPAIRMENTS WAS STUDIED. A TOTAL OF 890 SUBJECTS WERE TESTED ON THE MARK II. THE MOST RELIABLE TESTS ARE THE TESTS FOR STATIC ACUITY (UNDER CONDITIONS OF GLARE, NORMAL ILLUMINATION, AND REDUCED ILLUMINATION), DYNAMIC VISUAL ACUITY, AND DETECTION-ACQUISITION-INTERPRETATION (A MEASURE OF VISUAL SEARCH EFFICIENCY). TESTS CONSIDERED LESS RELIABLE AND IN NEED OF MODIFICATIONS WERE THOSE DESIGNED TO MEASURE THRESHOLD FOR ANGULAR MOVEMENT AND MOVEMENT IN-DEPTH, AND ANGULAR EXTENT OF THE VISUAL FIELD IN THE HORIZONTAL AXIS. REGRESSION ANALYSES USING ACCIDENT RATE OR FREQUENCY AS CRITERION VARIABLES INDICATED THAT - DEPENDING ON THE AGE GROUP - THE MULTIPLE CORRELATION BETWEEN PERFORMANCE ON THE VISION TEST BATTERY AND THE CRITERION VARIABLE VARIED FROM .12 TO .31. THE RELATIVE CONTRIBUTION OF THE INDIVIDUAL TESTS TO THE PREDICTION OF ACCIDENT INVOLVEMENT VARIED AS A FUNCTION OF THE AGE GROUP, THE CRITERION VARIABLE, AND THE LIGHT CONDITION (DAY VS. NIGHT). IN GENERAL, THE MOST CONSISTENTLY RELATED TO ACCIDENTS WERE THE TESTS FOR DYNAMIC VISUAL ACUITY, STATIC ACUITY UNDER LOW LEVELS OF ILLUMINATION, AND CENTRAL ANGULAR MOVEMENT. ACUITY IN LOW LEVELS OF ILLUMINATION WAS SPECIFICALLY ASSOCIATED WITH NIGHTTIME ACCIDENTS.

by DAVID SHINAR
INDIANA UNIV. SCHOOL OF PUBLIC AND ENVIRONMENTAL AFFAIRS, INST. FOR RES. IN PUBLIC SAFETY, BLOOMINGTON, IND. 47401
DOT-HS-5-01275
Rept. No. DOT-HS-5-01275; 1977; 303P REFS
REPT. FOR 1 JUL 1975-30 OCT 1977.
Availability: NTIS

HS-803 261

DEVELOPMENT OF A VISIBILITY RESEARCH CAPABILITY. FINAL REPORT

A SET OF REQUIREMENTS IS SET FORTH FOR USE AS GUIDELINES IN APPRAISING THE POTENTIAL SUCCESS OF A NUMBER OF ALTERNATIVE TECHNICAL APPROACHES IN DEVELOPING VISIBILITY RESEARCH CAPABILITY. THE CRITERIA INCLUDE PRESENTATION OF STIMULI IN THE FULL 360° FIELD OF VIEW, DYNAMIC AND REALISTIC PRESENTATION OF STIMULI IN A VARIETY OF CRITICAL TIME-STRESSED SITUATIONS, REPEATABILITY, SAFETY, RELIABILITY OF MEASUREMENT, AND CAPABILITY OF USE ON AUTOMOBILES OR SMALL TRUCKS WITH EASY CHANGE FROM ONE VEHICLE TO ANOTHER. OTHER CRITERIA SPECIFIED CAPABILITY OF USING A TEST

BUCK WITH VARIABLE UPPER STRUCTURE, LOW OPERATING AND MAINTENANCE COSTS, TRANSPORTABILITY, AND MINIMUM DELAY IN ATTAINING TEST CAPABILITY. THROUGH A REVIEW OF THE LITERATURE, DISCUSSIONS WITH RESOURCE PEOPLE, AND VISITS TO FACILITIES AT WHICH RELEVANT EQUIPMENT AND/OR ACTIVITIES COULD BE SEEN, A NUMBER OF ALTERNATIVE APPROACHES WERE COMPARATIVELY EVALUATED. SIMULATION EMPLOYING MOTION-PICTURE DISPLAYS SHOULD BE CONSIDERED AS A SHORT-TERM MEANS FOR CONDUCTING THE DESIRED RESEARCH; ON A LONG TERM BASIS, CONSIDERATION SHOULD BE GIVEN TO THE USE OF SIMULATION WITH COMPUTER-GENERATED IMAGERY, POSSIBLY IN COMBINATION WITH OTHER VISUAL DISPLAY TECHNIQUES. PERFORMANCE SPECIFICATIONS ARE SET FORTH FOR EACH OF THESE SIMULATION APPROACHES.

by ALBERT BURG; JINX BEERS; MAYER R. BRENNER
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DOT-HS-6-01451
Rept. No. UCLA-ENG-7754; 1977; 221P REFS
REPT. FOR 30 JUL 1976-5 AUG 1977.
Availability: NTIS

HS-803 263

MEASUREMENT OF PEDESTRIAN BEHAVIOR: A HANDBOOK FOR IDENTIFYING THE BEHAVIORS TO MEASURE AND THE MEASUREMENT SYSTEMS FOR USE IN COUNTERMEASURE EVALUATION. INTERIM REPORT

AN APPROACH TO PEDESTRIAN BEHAVIOR EVALUATION EMPHASIZES THE CAPABILITY OF A COUNTERMEASURE TO MODIFY CRITICAL PEDESTRIAN AND DRIVER BEHAVIORS PRESUMED TO RELATE TO VARIOUS TYPES OF ACCIDENTS. A CATEGORIZATION OF BEHAVIORAL ITEMS WAS DEVELOPED WHICH INCLUDES ONLY SEARCH AND LOCOMOTION BEHAVIORS. THERE ARE FIVE PARAMETERS OF PEDESTRIAN SEARCHING BEHAVIOR: OBJECT, DIRECTION, DURATION, SEQUENCE, AND POSITION. THE TERMS REFER TO, RESPECTIVELY, THE PEDESTRIAN'S OBJECT(S) OF ATTENTION WHILE SEARCHING, WHAT DIRECTION HE LOOKS IN, HOW LONG HE LOOKS IN EACH DIRECTION, THE SEQUENCE OF DIRECTIONAL SEARCHES, AND HIS POSITION WHEN SEARCHING. FOUR PARAMETERS OF PEDESTRIAN LOCOMOTION ARE VELOCITY, ACCELERATION, DIRECTION, AND POSITION. PARAMETERS CONCERNED WITH DRIVER BEHAVIOR ARE ESSENTIALLY EQUIVALENT TO PEDESTRIAN PARAMETERS. LOCOMOTION PARAMETERS INCLUDE VEHICLE MOVEMENT CHARACTERISTICS AND DRIVER CONTROL CHARACTERISTICS. JUDGMENTS WERE MADE AS TO WHICH OF THE BEHAVIORAL PARAMETERS WERE LIKELY TO BE SIGNIFICANTLY IMPACTED UPON GIVEN THE IMPLEMENTATION OF EACH OF 24 POTENTIAL COUNTERMEASURES. THESE JUDGMENTS WERE FORMULATED FOR EACH OF 11 SELECTED ACCIDENT TYPES. THE RESULT WAS THE DETERMINATION OF A SET OF BEHAVIORS WHICH WERE PRESUMED TO BE MOST IMPORTANT TO MEASURE FOR THE PURPOSE OF EVALUATING THE EFFECTIVENESS OF A COUNTERMEASURE ON A SPECIFIC ACCIDENT TYPE. ELEVEN MEASUREMENT SYSTEMS WERE EVALUATED IN TERMS OF THEIR COST EFFECTIVENESS IN MEASURING EACH OF THE BEHAVIORAL PARAMETERS. EFFECTIVENESS WAS ASSESSED ALONG SIX DIMENSIONS. A TOTAL SYSTEM EFFECTIVENESS INDEX WAS COMPUTED AS THE PRODUCT OF THE RATINGS OF A SYSTEM ON EACH DIMENSION, WITH FIVE COST COMPONENTS IDENTIFIED WHICH CONSTITUTED THE TOTAL COST OF SYSTEM USE. APPENDICES INCLUDE DESCRIPTIONS OF MEASUREMENT SYSTEMS, ACCIDENT TYPES, AND COUNTERMEASURES.

by ANDREW M. ROSE; JERROLD M. LEVINE; ELLEN J. EISNER
AMERICAN INSTITUTES FOR RES., 1055 THOMAS JEFFERSON ST., N.W., WASHINGTON, D.C. 20007
DOT-HS-5-01187
1976; 105P 5REFS
REPT. FOR JUN 1975-SEP 1976.
Availability: NTIS

HS-803 264

TRAINING OF DRIVER LICENSING ADMINISTRATIVE HEARING OFFICERS. FINAL TECHNICAL REPORT

TEN TWO-DAY IN-SERVICE TRAINING SEMINARS WERE CONDUCTED FOR STATE MOTOR VEHICLE AGENCY PERSONNEL RESPONSIBLE FOR HOLDING ADMINISTRATIVE HEARINGS. SEMINARS FOCUSED ON THE LEGAL, PUBLIC SAFETY, AND INTERPERSONAL ASPECTS OF THE HEARING PROCESS. A TOTAL OF 155 TRAINEES FROM TEN STATES COMPLETED THE SEMINARS. THE SEMINAR FORMAT CONSISTED OF LECTURES, GROUP DISCUSSIONS, DEMONSTRATIONS, AND ROLE-PLAYING EXERCISES (MOCK HEARINGS) IN TEN UNITS. PRINCIPAL INPUTS TO EVALUATION OF SEMINAR EFFECTIVENESS WERE THE TEN-QUESTION TEST QUESTIONNAIRES COMPLETED BEFORE AND AFTER THE SEMINARS BY TRAINEES. SCORES INCREASED BY 17% FROM BEGINNING TO END OF THE SEMINAR. SEMINARS APPEARED TO BE EFFECTIVE IN IMPROVING UNDERSTANDING OF THE DRIVER LICENSING ADMINISTRATIVE HEARING OFFICER ROLE AND FUNCTIONS, WITH THE MOST INCREASE IN KNOWLEDGE CONCERNING LEGAL ASPECTS OF THAT ROLE. ADMINISTRATIVE EVALUATION RESPONSES INDICATED THAT THE SEMINAR WAS WELL DESIGNED, WELL ADMINISTERED, AND WELL RECEIVED BY TRAINEES. A SECOND SERIES OF SEMINARS IS RECOMMENDED. APPENDICES PRESENT FORMS USED FOR SEMINAR EVALUATION; MATERIALS TRANSMITTED TO CANDIDATE STATES; AND LISTS OF TRAINEES.

by J. F. OATES, JR.
DUNLAP AND ASSOCIATES, INC., ONE PARKLAND DRIVE, DARIEN, CONN. 06820
DOT-HS-6-01475
1977; 53P 2REFS
REPT. FOR SEP 1976-SEP 1977.
Availability: NTIS

HS-803 265

MAINTENANCE COMPARISON ON FMVSS [FEDERAL MOTOR VEHICLE SAFETY STANDARD] NO. 121 CONFIGURED VEHICLES VERSUS NON 121 CONFIGURED VEHICLES. FINAL REPORT

RESEARCH HAS BEEN CONDUCTED TO PRESENT ACCURATE AND OBJECTIVE DATA ON BRAKE SYSTEM MAINTENANCE COST, TIRE OPERATING COST, ACCIDENT FREQUENCY, AND FUEL CONSUMPTION FOR VEHICLES CONFIGURED IN ACCORDANCE WITH FEDERAL MOTOR VEHICLE SAFETY STANDARD (FMVSS) 121. FOR COMPARATIVE PURPOSES, DATA ARE PRESENTED FOR VEHICLES SIMILAR TO THE SELECTED FMVSS 121 CONFIGURED VEHICLES WITH RESPECT TO GROSS VEHICLE WEIGHT RATING, ENGINE TYPE, AND TRANSMISSION TYPE, BUT WHICH WERE MANUFACTURED AND PLACED IN SERVICE PRIOR TO THE ENACTMENT OF FMVSS 121. THE SOURCE MAINTENANCE HISTORY, OPERATING DATA, AND ACCIDENT DATA USED WERE EXTRACTED FROM A COMPUTERIZED DATA BASE WHICH IS MAINTAINED ON A SERVICE BASIS FOR VEHICLE FLEETS OF VARIOUS TYPES. THE SOURCE DATA SYSTEM IS COMPATIBLE WITH THE VEHICLE MAINTENANCE REPORTING STANDARDS DEVELOPED BY THE AMERICAN TRUCKING ASSOCIATIONS, INC. THE DATA PRESENTED REFLECT APPROXIMATELY 57.4 MILLION OPERATING MILES FOR 508 FMVSS 121-CONFIGURED VEHICLES AND APPROXIMATELY 123.2 MILLION OPERATING MILES FOR 536 PRE-FMVSS 121 VEHICLES. BRAKE SYSTEM MAINTENANCE COST IS PRESENTED IN TERMS OF LABOR HOURS PER MILE AND PART DOLLARS PER MILE. ACCIDENT FREQUENCY REPORTS INCLUDE ALL ACCIDENT OCCURRENCES WHICH RESULTED IN PERFORMANCE OF ACCIDENT REPAIRS. ACCIDENT FREQUENCIES ARE TABULATED IN 25,000 MILE INCREMENTS. ACCIDENT QUESTIONNAIRE SURVEYS WERE SENT OUT FOR ACCIDENT OCCURRENCES. FUEL CONSUMPTION AND TIRE OPERATING COST ARE TABULATED BY PRIMARY VEHICLE GROUP FOR ALL OBSERVED MILES AND ALL OBSERVED VEHICLES FOR WHICH DATA ARE AVAILABLE. AN APPENDIX DETAILS SIZE AND LOCATION OF FLEETS USED IN THE STUDY.

by JON F. WHITE 2ND; JAMES N. MILLER
BURLINGTON FLEET SERVICES, P.O. BOX 21207,
GREENSBORO, N.C. 27420
DOT-HS-6-01457
1977; 54P
REPT. FOR AUG 1976-DEC 1977.
Availability: NTIS

HS-803 266

ESTIMATING THE EFFECTS OF THE CRASH-PHASE FMVSS [FEDERAL MOTOR VEHICLE SAFETY STANDARD] ON DRIVER FATALITY RISK IN TWO-CAR COLLISIONS. FINAL REPORT

THE RISK OF DRIVER FATALITIES IN COLLISIONS WAS COMPARED BETWEEN TWO CARS TO ESTIMATE THE EFFECTS OF THE CRASH-PHASE FEDERAL MOTOR VEHICLE SAFETY STANDARDS. TO AVOID THE USE OF THE ACCIDENT INVOLVEMENT FIGURES WHICH MAY BE INACCURATE, ONLY COLLISIONS BETWEEN TWO CARS IN WHICH EXACTLY ONE DRIVER WAS KILLED WERE STUDIED. THE INFLUENCES OF THE FACTORS, COLLISION TYPE, VEHICLE WEIGHT, AND DRIVER AGE AND SEX WERE MODELED BY LOW-ORDER POLYNOMIALS. THE REPRESENTATIONS ACHIEVED WERE NOT FULLY SATISFACTORY. TO ESTIMATE THE IMPACT OF THE CRASH-PHASE FEDERAL MOTOR VEHICLE SAFETY STANDARDS, REMAINING DIFFERENCES BETWEEN CARS OF DIFFERING MODEL YEARS WERE COMPARED. THE COMPARISONS SUGGEST DIFFERENCES BETWEEN PRE-1968 AND POST-1967 MODEL YEARS ONLY, AND NO SYSTEMATIC DIFFERENCES WITHIN THESE GROUPS. THE MOST DEFINITIVE RESULT IS THAT IN FRONT/FRONT COLLISIONS THE FATALITY RISK IN POST-1967 CARS IS 22% LOWER THAN IN THE EARLIER MODEL YEARS (WITH A STANDARD ERROR OF FIVE). THE RESULT IS LESS CERTAIN FOR FRONT/SIDE IMPACTS WHERE THE FATALITY RISK FOR THE DRIVER OF THE STRIKING CAR APPEARS TO BE REDUCED 30% TO 38%, AND FOR THE DRIVER OF THE STRUCK CAR, 11% TO 12% (WITH NOT NORMALLY DISTRIBUTED STANDARD ERRORS OF 15 TO 19). IMPROVEMENTS OF THE ESTIMATES THROUGH REFINEMENT OF THE MODEL AND ADDITIONAL DATA APPEAR POSSIBLE. APPENDICES PROVIDE A DESCRIPTION OF THE DATA FILE AND VARIABLES USED IN SYMMETRIC AND NONSYMMETRIC CASES, AS WELL AS DESCRIPTION AND OUTPUT OF REGRESSION RUNS.

by HANS C. JOKSCH; GARY HAAS
CENTER FOR THE ENVIRONMENT AND MAN, INC.,
275 WINDSOR ST., HARTFORD, CONN. 06120
NHTSA-7-3261
1977; 83P 2REFS
Availability: NTIS

HS-803 267

HUMAN FACTORS REQUIREMENTS FOR FINGERTIP REACH CONTROLS. FINAL REPORT

A PROJECT WAS INSTITUTED TO DEVELOP HUMAN FACTORS RECOMMENDATIONS FOR FINGERTIP REACH CONTROLS. INTERVIEWS WERE CONDUCTED WITH 405 DRIVERS OF CARS EQUIPPED WITH FINGERTIP REACH CONTROLS. A HIGH PERCENTAGE OF FINDING PROBLEMS WAS REPORTED WHEN THE HORN WAS MOUNTED ON A STALK AND ALSO WHEN THE TURN SIGNAL WAS ON A RIGHT STALK. DRIVERS OF CONFIGURATIONS WITH TWO LEFT STALKS HAD A LARGE PERCENTAGE OF OPERATING PROBLEMS FOR THE TURN SIGNAL AND FOR THE HEADLIGHT BEAM SELECTOR. A LABORATORY EXPERIMENT WAS CONDUCTED TO EVALUATE MODES OF OPERATION FOR THE WIPER ON/OFF, WIPER SPEED, AND WASHER ON/OFF FUNCTIONS WHEN THESE CONTROLS WERE LOCATED ON ONE LEFT STALK. SUBJECTS PERFORMED BEST WHEN WIPER ON/OFF AND WIPER SPEED WERE CONTROLLED BY A ROTATING HAND SWITCH. PERFORMANCE ON STALK MOUNTED CONTROL FUNCTIONS WAS FASTER AND REQUIRED FEWER DIRECT LOOKS THAN PERFORMANCE ON DASH MOUNTED FUNC-

TIONS. THE TURN SIGNAL, HEADLIGHT BEAM SELECTOR, AND FLASH-TO-PASS CONTROLS SHOULD BE LOCATED ON ONE LEFT STALK. THE WIPER ON/OFF, WIPER SPEED, AND WASHER CONTROLS SHOULD BE LOCATED TO THE LEFT OF THE DRIVER AT FINGERTIP REACH, AND IF STALK MOUNTED, ON THE SAME STALK. SUGGESTION WAS MADE THAT FUTURE RESEARCH BE CONDUCTED ON ASSESSING THE POTENTIAL BENEFITS OF PUTTING ADDITIONAL CONTROLS AT FINGERTIP REACH. APPENDICES INCLUDE ANALYSIS OF VARIANCE SUMMARY TABLES; AND FURTHER ANALYSIS OF ESSEX CORP. QUESTIONNAIRE DATA.

by R. R. MOURANT; E. MOUSSA-HAMOUDA; J. M. HOWARD
WAYNE STATE UNIV., DEPT. OF INDUSTRIAL ENGINEERING AND OPERATIONS RES., 640 PUTNAM, DETROIT, MICH. 48202
DOT-HS-5-01192
1977; 121P 7REFS
REPT. FOR JUL 1975-AUG 1977.
Availability: NTIS

HS-803 268

NDR [NATIONAL DRIVER REGISTER] RAPID RESPONSE SYSTEM SUPPORT SERVICES. INTERIM REPORT

RESEARCH INDICATES THAT DEVELOPMENT OF AN ON-LINE NATIONAL DRIVER REGISTER (NDR) SYSTEM IS TECHNICALLY FEASIBLE, THE PRINCIPAL MISSING ELEMENT BEING THE TELECOMMUNICATIONS NETWORK. USE OF EITHER A GOVERNMENT OPERATED NETWORK OR A COMMERCIAL FACILITY ARE LOGICAL NETWORK SOLUTIONS WITHIN POLICY AND PRIVACY CONSTRAINTS. ANNUAL NETWORK COSTS RANGE FROM $25,000 FOR THE FIRST YEAR OF A PILOT DEMONSTRATION SYSTEM TO $110,000 FOR A SYSTEM WITH 16 STATES ON-LINE IN 1985. NETWORK COSTING IS SCHEDULED FOR REFINEMENT DURING PHASE II AND WOULD DEVELOP A DEFINITIVE NETWORK RECOMMENDATION AND DETAILED, SPECIFIC COSTS. THE AVOIDANCE OF SEVEN TRAFFIC FATALITIES THROUGH NDR ACTION WOULD OFFSET COST OF THE PRESENT SYSTEM BY AVOIDING THE SOCIETAL COSTS OF THESE FATALITIES. AN INCREASE OF 1% IN POSITIVE NDR RESPONSES WOULD MORE THAN DOUBLE THE POTENTIAL FOR AVOIDING LARGE NUMBERS OF THE 3.9 MILLION INJURIES RESULTING FROM MOTOR VEHICLE ACCIDENTS AS WELL AS THE ASSOCIATED PUBLIC SECTOR COSTS. THE 16-STATE ON-LINE SYSTEM WITH OTHER STATES CONTINUING BATCH/MAIL WOULD COST ONLY 28% MORE THAN THE PRESENT SYSTEM IN CURRENT DOLLARS. AN APPENDIX DETAILS THE OUTLINE PRIVACY/SECURITY PLAN.

by WALLACE E. NICKEL; GERALD SIERACKI; JAMES WOOD, 2ND.; RICHARD L. DEAL
RICHARD L. DEAL AND ASSOCIATES, INC., 10560 MAIN ST., FAIRFAX, VA. 22030
DOT-HS-7-01642
1977; 101P 17REFS
REPT. FOR MAY-JUL 1977.
Availability: NTIS

HS-803 269

ALCOHOL/SAFETY PUBLIC INFORMATION MATERIALS CATALOG. NO. 3, SUPP. 2

MATERIAL IS LISTED FOR USE BY PERSONS DEVELOPING PUBLIC INFORMATION PROGRAMS ON ALCOHOL AND HIGHWAY SAFETY. PROMOTIONAL MATERIALS ARE ARRANGED BY PRODUCING ORGANIZATION AND BY TYPE, PRECEDED BY AN INDEX OF ORGANIZATIONS UNDER TEN BROAD SUBJECT CATEGORIES. ARTICLES AND REPORTS ARE ARRANGED BY TITLE AND INDEXED BY ORGANIZATION, AUTHOR, AND SUBJECT. BORROWING PROCEDURES ARE OUTLINED. ITEMS ARE IDENTIFIED BY LIBRARY ACCESSION NUMBER.

by ANN C. GRIMM, COMP.
UNIVERSITY OF MICHIGAN, HWY. SAFETY RES. INST., HURON PKWY. AND BAXTER RD., ANN ARBOR, MICH. 48109
NHTSA-7-3371
Rept. No. UM-HSRI-78-1; 1978; 40P REFS
Availability: NTIS

HS-803 271

FIVE YEAR PLAN FOR MOTOR VEHICLE SAFETY AND FUEL ECONOMY RULEMAKING AND INVITATION FOR APPLICATIONS FOR FINANCIAL ASSISTANCE. 49 CFR CHAPTER 5

A NATIONAL HWY. TRAFFIC SAFETY ADMINISTRATION (NHTSA) NOTICE INVITES PUBLIC COMMENT ON A DRAFT PLAN FOR THE MOTOR VEHICLE SAFETY AND FUEL ECONOMY RULEMAKING OF NHTSA OVER THE NEXT FIVE YEARS. THE PLAN BRIEFLY DESCRIBES THE CRITERIA USED TO ESTABLISH PROPOSED RULEMAKING PRIORITIES AND EACH PLANNED RULEMAKING ACTION. COMMENTS AND APPLICATIONS FOR FINANCIAL ASSISTANCE TO MAKE COMMENTS ARE DUE BY 14 JUN 1978. THE FIVE-YEAR PLAN IS PRESENTED IN TWO SECTIONS: TENTATIVE RULEMAKING GOALS AND PRIORITIES; AND A RULEMAKING SCHEDULE. MOTOR VEHICLE SAFETY IS THE FIRST RULEMAKING PRIORITY, INCLUDING OCCUPANT PROTECTION, LIGHT TRUCKS AND VANS, PEDESTRIAN SAFETY, AND BRAKING SYSTEMS. SOME 26 FEDERAL MOTOR VEHICLE SAFETY STANDARDS (FMVSS'S) IDENTIFY AREAS IN WHICH NEW RULEMAKING ACTIVITY WILL BE AT A MINIMUM. THE SECOND RULEMAKING PRIORITY, MOTOR VEHICLE FUEL ECONOMY, INVOLVES ESTABLISHMENT AND MODIFICATION OF AVERAGE FUEL ECONOMY STANDARDS FOR PASSENGER AUTOMOBILES, LIGHT TRUCKS AND VANS; AND FOR ESTABLISHING AND REVISING PROCEDURAL REGULATIONS UNDER AUTHORITY OF TITLE V, MOTOR VEHICLE INFORMATION AND COST SAVINGS ACT. THE RULEMAKING SCHEDULE LISTS PROPOSED EFFECTIVE DATES AT WHICH TIME THE RULE TAKES EFFECT FOR A PARTICULAR VEHICLE MODEL YEAR. INCLUDED ARE 20 RULEMAKING INITIATIVES, NINE TECHNICAL AMENDMENTS, AND 14 EXPLORATORY RULEMAKING ACTIONS. THIRTEEN TER-

MINATED MOTOR VEHICLE SAFETY RULEMAKING ACTIVITIES ARE BRIEFLY DESCRIBED.

NATIONAL HWY. TRAFFIC SAFETY ADMINISTRATION, WASHINGTON, D.C. 20590
1978; 45P
APPENDICES ARE HS-803 272.
Availability: CORPORATE AUTHOR

HS-803 272

NHTSA MOTOR VEHICLE SAFETY AND FUEL ECONOMY RULEMAKING PLAN. APPENDICES. DESCRIPTIONS OF CONTEMPLATED MOTOR VEHICLE SAFETY RULES

CONTEMPLATED MOTOR VEHICLE SAFETY RULES INCLUDED IN THE NATIONAL HWY. TRAFFIC SAFETY ADMINISTRATION'S (NHTSA) RULEMAKING PLAN ARE DISCUSSED IN DETAIL IN THREE APPENDICES. THE FIRST APPENDIX COVERS 22 RULEMAKING INITIATIVES, WHICH REPRESENT AREAS WHERE INFORMATION IS SUFFICIENT TO JUSTIFY AN ACTION. NINE TECHNICAL AMENDMENTS, WHICH ARE MINOR RULEMAKING ACTIONS WITH THE PURPOSE OF CLARIFYING EXISTING REQUIREMENTS OR RESOLVING SPECIFIC TECHNICAL PROBLEMS ARE ALSO COVERED. THE THIRD APPENDIX DETAILS 17 EXPLORATORY RULEMAKING ACTIVITIES, WHICH INCLUDE RULEMAKING AREAS WHERE INFORMATION IS NOT CURRENTLY SUFFICIENT TO PERMIT THE SCHEDULING OF A SPECIFIC ISSUANCE DATE. EACH RULEMAKING ACTION DISCUSSED IS PRESENTED BY TITLE, DESCRIPTION, SAFETY PROBLEM, APPROACH, AND RULEMAKING SCHEDULE. THE RULEMAKING SCHEDULE ON EACH ACTION IN THE THIRD APPENDIX IS TO BE DETERMINED AFTER FURTHER EXPLORATION. TYPES OF VEHICLES CONSIDERED INCLUDE TRUCKS, MOTORCYCLES, PASSENGER CARS, AND SCHOOL BUSES. PROTECTION FOR OCCUPANTS, FOR PEDESTRIANS, AND FOR SUCH SPECIAL GROUPS AS CHILDREN AND THE HANDICAPPED IS CONSIDERED, AS ARE STANDARDS FOR VARIOUS TYPES OF VEHICLE EQUIPMENT.

NATIONAL HWY. TRAFFIC SAFETY ADMINISTRATION, WASHINGTON, D.C. 20590
1978; 53P
TEXT IS HS-803 271.
Availability: CORPORATE AUTHOR

HS-803 281

HIGHWAY SAFETY PROGRAM MANUAL, VOL. 102: HIGHWAY SAFETY PLAN

A PROGRAM MANUAL ESTABLISHES NATIONAL HWY. TRAFFIC SAFETY ADMINISTRATION (NHTSA) AND FEDERAL HWY. ADMINISTRATION (FHWA) POLICY AND PROCEDURES FOR THE SUBMISSION OF EACH STATE'S HWY. SAFETY PLAN (HSP). THE HSP PROVIDES MULTIYEAR PLANNING CAPABILITY AND CURRENT YEAR PROGRAM IMPLEMENTATION FOR THE EXECUTION OF A FEDERAL-AID AGREEMENT. AN INTRODUCTORY SECTION INCLUDES AUTHORITY, GENERAL REQUIREMENTS, POLICY, AND CIVIL RIGHTS REQUIREMENTS. A CHAPTER ON CONTENT OF HSP PROVIDES GUIDELINES FOR PREPARATION ACCORDING TO A SIX-PART APPROVED FORMAT WHICH SETS FORTH A SUMMARY, STATEWIDE PROBLEM ANALYSIS, GOALS, PROGRAM STRUCTURE, PROGRAM MODULES, AND REQUIREMENTS FOR PROBLEM SOLUTION. SUBMISSION AND APPROVAL PROCEDURES INCLUDE SUCH STEPS AS ENVIRONMENTAL IMPACT REVIEW, REVISION, ANNUAL UPDATING, AND MATCHING OF FEDERAL FUNDS. THE FOURTH CHAPTER DEFINES TYPES OF EVALUATION AND PROVIDES REQUIREMENTS FOR EVALUATION PLANNING. THE LAST CHAPTER DEFINES REPORTING REQUIREMENTS FOR EVALUATION PLANNING. THE LAST CHAPTER ALSO DEFINES REPORTING REQUIREMENTS OF THE HSP, INCLUDING MANAGEMENT INFORMATION SYSTEM DATA REPORTING, TITLE VI REPORTING, AND MINORITY BUSINESS ENTERPRISE REPORTING. NINE APPENDICES ARE INCLUDED, GIVING TERM DEFINITIONS, ADDITIONAL GUIDELINES, AND SAMPLE PARTS OF HSP REPORTS.

NATIONAL HWY. TRAFFIC SAFETY ADMINISTRATION; FEDERAL HWY. ADMINISTRATION, WASHINGTON, D.C. 20590
Rept. No. NHTSA/FHWA-960-2/7510.3; 1978; 47P
Availability: CORPORATE AUTHOR

HS-803 282

RESEARCH SAFETY VEHICLE TECHNICAL REPORT, PHASE 3. STATUS REPORT NO. 7, 1 JANUARY TO 28 FEBRUARY 1978

DURING THE CURRENT REPORTING PERIOD VALIDATION TESTING OF THE PHASE III RESEARCH SAFETY VEHICLE (RSV) WAS INITIATED WITH THREE OF FIVE DYNAMIC VEHICLES. TESTING INCLUDED STATIC CRUSH; RESTRAINT VALIDATION; FUNCTIONAL SYSTEM; DURABILITY/VIBRATION; DRIVEABILITY; HANDLING AND BRAKING; AND INTEGRATED SYSTEMS VALIDATION TESTS. BODY DESIGN IS NOW COMPLETE EXCEPT FOR MODIFICATION TO THE FRONT RAIL STRUCTURE WHICH HAS BEEN UNDERTAKEN TO REDUCE THE INTRUSION EXPERIENCED IN THE INITIAL BARRIER TEST. DESIGN OF THE INTERIOR PADDING FOR OCCUPANT PROTECTION IS COMPLETE, INCLUDING THE INSTRUMENT PANEL AND STEERING COLUMN DESIGN FOR BOTH THE AIRBELT AND AIRBAG RESTRAINT SYSTEMS. THE POWER SUPPLY FOR THE PASSIVE BELT MECHANISM IS BEING REVIEWED TO ENSURE AN ADEQUATE VOLTAGE AND SATISFACTORY OPERATION UNDER ALL CONDITIONS. CHASSIS DESIGN IS COMPLETE. THE CLUTCH, SHIFT, AND THROTTLE LINKAGE MECHANISMS WERE REVISED TO UTILIZE A MAXIMUM NUMBER OF HIGH PRODUCTION PARTS FROM THE CHRYSLER OMNI/HORIZON VEHICLES. THE BRAKE LINE LAYOUT IS COMPLETE, AND THE ANTISKID BRAKE SYSTEM IS BEING TESTED AT BENDIX ON A C-6. THE DESIGN OF POWER STEERING GEAR IS COMPLETE, AND THE CIBIE SINGLE BEAM LIGHTING SYSTEM IS BEING EVALUATED IN DRIVING TESTS IN A CAR AT CHRYSLER. TO ENHANCE BOTH SAFETY AND CONSUMER ACCEPTANCE, 3M REFLECTIVE STRIPING

HAS BEEN ADDED ON THE PERIPHERY OF THE BODY. NEGOTIATIONS FOR FABRICATION OF THE PHASE IV VEHICLE BUILD WILL BE CONDUCTED EARLY IN THE NEXT REPORTING PERIOD. A CHRONOLOGICAL LIST OF EVENTS, A SCHEDULE, AND COST CHARTS ARE INCLUDED.

CALSPAN CORP., BUFFALO, N.Y. 14221
DOT-HS-7-01551
Rept. No. PROJ-ZN-6069-V-17; 1978; 87P 3REFS
Availability: REFERENCE COPY ONLY

HS-810 304

REMARKS BY JOAN CLAYBROOK BEFORE THE DETROIT AUTO WRITERS, DETROIT, MICHIGAN, JULY 12, 1977

THE MOST CRITICAL NEWS AND EDITORIAL COMMENTARY ABOUT THE AUTO INDUSTRY COMES FROM MAJOR NEWS MEDIA OUTSIDE OF DETROIT, ALTHOUGH THE AUTO WRITERS IN DETROIT HAVE UNIQUE ACCESS TO THE DAY-TO-DAY ACTIVITIES OF THIS INDUSTRY AND THE OPPORTUNITY TO PROBE FOR INFORMATION AMONG THE ENGINEERS, TECHNICIANS, AND MANAGERS. MS. CLAYBROOK SAID THAT SHE IS LOOKING FORWARD TO LEARNING FROM THE DETROIT AUTO WRITERS ABOUT THE FACTS UNDERLYING COMPANY POLICIES AND INNOVATION WITHIN THE AUTO COMPANIES. THE MAJOR PORTION OF THE DISCUSSION CENTERS AROUND THE COSTS TO THE AUTO INDUSTRY OF SAFETY/ENVIRONMENTAL REGULATIONS SUCH AS THOSE CONCERNING PASSIVE RESTRAINT SYSTEMS AND EMISSIONS STANDARDS. MOTOR VEHICLE CRASHES COST AMERICAN SOCIETY ABOUT $38 BILLION EVERY YEAR IN TERMS OF DEATHS, INJURIES, LOST INCOME, AND PROPERTY DAMAGE, OR CLOSE TO THE SALES VOLUME FOR ALL NEW CARS. NHTSA ESTIMATES THAT IF MOTOR VEHICLE FATALITIES HAD CONTINUED AT THE SAME RATE AS IN 1968 WHEN THE FIRST SAFETY STANDARDS TOOK EFFECT, THERE WOULD HAVE BEEN APPROXIMATELY 75,000 KILLED ON THE HIGHWAY IN 1976 RATHER THAN 47,000. IN COMPARISON, THE COST TO THE AUTO MAKERS OF THE SAFETY REQUIREMENTS HAS BEEN RELATIVELY SMALL. THE INDUSTRY'S OWN FIGURES SHOW THAT ALL OF THE STANDARDS ISSUED BETWEEN 1967 AND 1974 (WHICH COVERS ALL THE MAJOR SAFETY STANDARDS NOW IN EFFECT) IN TOTAL ADDED AN AVERAGE OF $343 TO THE PRICE OF A CAR OVER THE SEVEN-YEAR PERIOD. THE INDUSTRY SAID THAT IF ALL THE STANDARDS WERE NOW REVOKED, CONSUMERS WOULD REALIZE A SAVING OF $80 PER CAR. THE AVERAGE PRICE INCREASE ON THE 1977 MODELS WAS SIX TIMES HIGHER THAN THE FEDERALLY-REQUIRED IMPROVEMENTS WERE WORTH. THE "BIG FOUR" AMERICAN CAR MANUFACTURERS HAD WORLDWIDE SALES BETWEEN $50 AND $60 BILLION ANNUALLY FOR THE PERIOD 1970-1974, BUT THEIR EXPENDITURES FOR RESEARCH AND DEVELOPMENT FOR THIS PERIOD WAS ABOUT 3.6% OF SALES, INCLUDING STYLISTIC AND PRODUCTIVITY CHANGES. IN THE EVENT THAT THE INDUSTRY REMAINS RELUCTANT TO GIVE CONSUMER INFORMATION ABOUT CAR SAFETY, THE PUBLIC WILL OTHERWISE BE

ASSISTED BY COMPARATIVE RATINGS OF AUTOM
BILES ACCORDING TO CRASHWORTHINESS, DAMAG
SUSCEPTIBILITY, AND EASE OF DIAGNOSIS/REPA
OF MECHANICAL/ELECTRICAL SYSTEMS AS MA
DATED BY TITLE II OF THE MOTOR VEHICLE INFO
MATION AND COST SAVINGS ACT.

by JOAN CLAYBROOK
NATIONAL HWY. TRAFFIC SAFETY
ADMINISTRATION, WASHINGTON, D.C. 20590
1977; 10P
Availability: NHTSA

HS-810 305

THE SNAIL'S PACE OF INNOVATION. REMARKS BEFORE THE AUTOMOTIVE NEWS WORLD CONGRESS, DETROIT, MICHIGAN, 13 JULY 1977

THE AMERICAN PEOPLE HAVE THE RIGHT TO HA
THE AUTO INDUSTRY'S MOST REASONABLE
FORTS TO REDUCE THE HUMAN AND ECONOM
COSTS ASSOCIATED WITH IMBALANCED ENGINEI
ING OF MOTOR VEHICLES. BESIDES THE EXISTI
LAWS AND REGULATIONS REGARDING MOTOR VE
CLE SAFETY, THERE ARE NUMEROUS FORCES TO
ENCOURAGED FOR THE "SOCIALLY RESPONSIBI
VEHICLE. THESE INCLUDE ASSEMBLY LINE W
KERS AND INSPECTORS WHO CAN CONTRIBU
MORE OF THEIR KNOWLEDGE AND EXPERIEN
ABOUT VEHICLE DESIGN, DEFECTS, AND DETE
ORATION AND THE ENGINEERING SOCIETIES WHO
SCIENTISTS, ENGINEERS, AND TECHNICIANS C
SHOW GREATER INITIATIVE INSIDE THEIR COM
NIES TO PROD MANAGEMENT TOWARD RENO
TION AND INNOVATION. IT IS IMPORTANT
DISTINGUISH BETWEEN INNOVATION THAT
NEEDED TO FULFILL THE CONSUMER HEALTH A
SAFETY RIGHTS AND THE KIND OF INNOVATI
WHICH MERELY REFINES THE ENGINEERING
THE HIGH COMPRESSION ENGINE. INNOVATI
BECOMES MORE NECESSARY AS THE PASS
YEARS EXPAND THE GAP BETWEEN THE GROW
OF PROBLEMS AND THE UNUSED ABILITY TO SO
THESE PROBLEMS. MS. CLAYBROOK CITES PAST
AMPLES OF THE AUTO INDUSTRY'S
WILLINGNESS TO DEVELOP CONSUMER-SENSIT
ENGINEERING (E.G. THE SPAGHETTI SHOULI
HARNESS AND BUMPERS WEIGHING OVER A H
DRED POUNDS). SHE CALLS UPON THE AUTO IND
TRY TO PRODUCE AUTOMOBILES WHICH
SAFER, MORE FUEL EFFICIENT, AND EASIER
REPAIR.

by JOAN CLAYBROOK
NATIONAL HWY. TRAFFIC SAFETY
ADMINISTRATION, WASHINGTON, D.C. 20590
1977; 17P
Availability: NHTSA

HS-810 306

REMARKS BEFORE THE AMERICAN ASSOCIATION OF MOTOR VEHICLE ADMINISTRATORS, HOUSTON, TEXAS, SEPTEMBER 29, 1977

THE WORK OF MOTOR VEHICLE ADMINISTRATORS IN DESIGNING AND MANAGING THE ISSUANCE AND REVOCATION OF DRIVER AND MOTOR VEHICLE LICENSES AND IN DEVELOPING TRAFFIC RECORD SYSTEMS THROUGHOUT THE COUNTRY SERVES AS A BASE OF THE NATIONAL TRAFFIC SAFETY PROGRAM. EFFECTIVENESS OF MOTOR VEHICLE ADMINISTRATORS IS HINDERED, HOWEVER, BY FAILURE TO TAKE ACTION ON SEVERAL PENDING DECISIONS, THE FIRST BEING ISSUANCE OF A UNIFORM VEHICLE IDENTIFICATION NUMBER AND ACTIONS TO REDUCE VEHICLE THEFT AND FRAUD. UNIFORM ASSIGNMENT OF VEHICLE IDENTIFICATION NUMBERS (VIN) IS ESSENTIAL IN TRACING VEHICLES. VIN SYSTEMS UNDER CONSIDERATION ARE THE VEHICLE EQUIPMENT SAFETY COMMISSION REGULATION VESC-15 AND THE INTERNATIONAL STANDARDS ORGANIZATION SYSTEM. OTHER PATHS TO REDUCTION OF VEHICLE THEFT AND FRAUD INCLUDE UNIFORM VEHICLE TITLING PROCEDURES, INCLUSION OF ODOMETER INFORMATION ON TITLES, IGNITION BUZZER, AND STEERING WHEEL LOCK. ANOTHER PENDING DECISION CONCERNS DRIVER IDENTIFICATION. THE POTENTIAL FOR PROBLEM DRIVERS TO BE LICENSED IN SEVERAL STATES MAKES RECORDKEEPING AND REGULATION AN IMPOSSIBLE TASK. NATIONAL USE OF THE SOCIAL SECURITY NUMBER IS RECOMMENDED AS A UNIFORM METHOD OF DRIVER IDENTIFICATION. UNIFORM DRIVER IDENTIFICATION NUMBERS SHOULD BE COUPLED WITH A NATIONAL DRIVER REGISTER WITH CAPABILITY FOR QUICK CHECKS ON DRIVER REGISTRATION AND PAST RECORD. RAPID RESPONSE CAPABILITY COULD BE PROVIDED BY COMPUTER ON-LINE INQUIRY. THE NATIONAL 55 MILES-PER-HOUR SPEED LIMIT IS NOT STRICTLY ENFORCED IN A NUMBER OF STATES; ACTIVE AND UNIFORM ENFORCEMENT IS ESSENTIAL TO EFFECTIVENESS OF MOTOR VEHICLE ADMINISTRATORS. USE OF SAFETY BELTS AND AN UNDERSTANDING OF THE VALUE OF PASSIVE RESTRAINT SYSTEMS FOR VEHICLES SHOULD ALSO BE ACTIVELY SUPPORTED BY MOTOR VEHICLE ADMINISTRATORS.

by JOAN CLAYBROOK
NATIONAL HWY. TRAFFIC SAFETY ADMINISTRATION, WASHINGTON, D.C. 20590
1977; 9P
Availability: CORPORATE AUTHOR

HS-810 309

REMARKS BEFORE THE INSURANCE PUBLIC RELATIONS CONFERENCE, WASHINGTON, D.C., OCTOBER 17, 1977

THE SENATE VOTE ON PASSIVE RESTRAINTS WAS A RESULT IN PART OF THE INSURANCE INDUSTRY'S PRESSURE AND ENCOURAGEMENT. THE RECENT GALLUP POLL RESULT, WHICH FOUND 46% OF THE PUBLIC IN FAVOR OF AIR BAGS, CAN ALSO BE PARTIALLY ATTRIBUTED TO PUBLIC RELATIONS EFFORTS OF THE INSURANCE INDUSTRY. RECOMMENDATION IS MADE THAT FUTURE PUBLIC RELATIONS EFFORTS IN THE INSURANCE INDUSTRY CENTER ON DESCRIBING TO THE PUBLIC THE INDUSTRY'S ROLE IN LOSS PREVENTION AND IN EXPRESSING THE RELATIONSHIP OF THE INDUSTRY'S OWN ECONOMIC INTEREST TO THE HEALTH AND SAFETY INTEREST OF INDIVIDUALS IN THIS SOCIETY. CONGRESSIONAL OPPOSITION IS EXPECTED AS AN AUTHORIZATION BILL FOR FUNDS TO THE NATIONAL HWY. TRAFFIC SAFETY ADMINISTRATION FOR THE PASSIVE RESTRAINT RULE IS INTRODUCED. SEVERAL EFFORTS WHICH THE INSURANCE INDUSTRY MIGHT MAKE TO ENCOURAGE IMPLEMENTATION OF PASSIVE RESTRAINTS ARE RECOMMENDED, THE FIRST BEING PREPARATION OF INFORMATION MATERIALS FOR INSURANCE CUSTOMERS. A SECOND EFFORT SHOULD FOCUS ON DISSEMINATION OF INFORMATION ABOUT AIR BAGS THROUGH ADVERTISING IN STATE AND LOCAL COMMUNITY NEWSPAPERS, AS WELL AS LOCAL RADIO AND TELEVISION. A THIRD SUGGESTED ENDEAVOR IS PRODUCTION AND SHOWING OF FILMS ON PASSIVE RESTRAINTS SUCH AS THE ONE PRODUCED BY NHTSA AND SHOWN DURING THIS PRESENTATION. SCHOOLS AND MOVIE THEATERS ARE PARTICULARLY RECOMMENDED FOR SHOWING OF FILMS. ANOTHER AVENUE FOR PUBLIC RELATIONS ON PASSIVE RESTRAINTS IS EDITORIAL STAFFS OF NEWSPAPERS. EFFORTS WITHIN INSURANCE COMPANIES TO ENCOURAGE PURCHASE OF FLEET CARS WITH AIR BAGS WILL ENCOURAGE INCREASED PRODUCTION, ESPECIALLY IF THOSE CARS ARE THEN USED FOR PUBLIC DEMONSTRATIONS. COMMUNICATION WITH INDUSTRIAL REPRESENTATIVES ABOUT PASSIVE RESTRAINTS MIGHT RESULT IN INCREASED INFORMATION DISSEMINATION IN INDUSTRY.

by JOAN CLAYBROOK
NATIONAL HWY. TRAFFIC SAFETY ADMINISTRATION, WASHINGTON, D.C. 20590
1977; 13P
Availability: CORPORATE AUTHOR

HS-810 310

THE FUTURE OF THE NATIONAL HIGHWAY SAFETY PROGRAM. REMARKS BEFORE THE NATIONAL SAFETY CONGRESS, CHICAGO, ILLINOIS, OCTOBER 17, 1977

THE MOST IMPORTANT ISSUE FACING THE TRAFFIC SAFETY ESTABLISHMENT, BOTH IN THE PRIVATE SECTOR AND IN GOVERNMENT, REGARDS ITS REACTION TO THE CONGRESSIONAL DECISION ON PASSIVE RESTRAINTS. THAT DECISION IS SEEN AS AN OPPORTUNITY FOR SAFETY ADVOCATES FROM MANY DIFFERENT FIELDS TO REORGANIZE AND COALESCE THEIR EFFORTS TOWARD GREATER VEHICLE AND HIGHWAY SAFETY. RESPONSIBILITIES FACING THE PRIVATE SECTOR INCLUDE REORIENTATION OF PROGRAMS TO ADDRESS THE VEHICLE, HIGHWAY, AND DRIVER AS A COORDINATED ISSUE, AND THE TASK OF SELLING HIGHWAY SAFETY TO THE AMERICAN PUBLIC. THE INSURANCE INDUSTRY

AND THE AMERICAN AUTOMOBILE ASSOC. HAVE BEGUN THIS PROCESS, AND THE NATIONAL SAFETY COUNCIL IN PARTICULAR IS ADMONISHED TO FOLLOW SUIT BY ACKNOWLEDGING THE ROLE OF THE VEHICLE IN AUTO CRASHES AND INJURIES. NOW THAT CONGRESS HAS VOTED IN FAVOR OF PASSIVE RESTRAINT REQUIREMENTS THE PRIVATE SECTOR AT LARGE IS EXPECTED TO SUPPORT THAT DECISION. THE PROCESS OF SELLING VEHICLE SAFETY TO THE PUBLIC CAN BE ACCOMPLISHED USING DEMONSTRATION AIRBAG CARS, AND GENERAL COORDINATION OF ALL KINDS OF PUBLIC INFORMATION ON VEHICLE AND HIGHWAY SAFETY, INCLUDING SEAT BELTS, ALCOHOL PROGRAMS, THE 55 MPH PROGRAM, AND CHILD RESTRAINTS. FUTURE GOALS AT THE FEDERAL LEVEL INCLUDE CONTINUATION OF THE PUBLIC EDUCATION PROGRAM ON PASSIVE RESTRAINTS, FURTHER VEHICLE IMPROVEMENTS, AND PEDESTRIAN PROTECTION. INDIVIDUAL STATES ARE IN THE PROCESS OF GAINING MORE AUTONOMY IN THEIR HIGHWAY SAFETY PROGRAMS, WITH CONTINUED UNIFORMITY OF FEDERAL REGULATIONS. ADVERTISING AND PUBLIC RELATIONS OPPORTUNITIES TO IMPROVE VEHICLE AND HIGHWAY SAFETY ARE OPEN TO SUPPLIERS, AND MOTOR VEHICLE AND ALCOHOL BEVERAGE INDUSTRIES. PRIVATE SECTOR PURCHASE OF FLEET CARS EQUIPPED WITH PASSIVE RESTRAINTS IS ENCOURAGED. THE NATIONAL SAFETY COUNCIL IS ENCOURAGED TO PRESSURE COMMERCIAL AND POLITICAL INTERESTS TO PUSH FOR VEHICLE SAFETY ITEMS, TO EDUCATE YOUNG PEOPLE, AND TO PRESS FOR PUBLIC SERVICE ATTENTION TO TRAFFIC SAFETY VIA DRIVER PROGRAMS AND NHTSA'S DEFECT SAFETY PROGRAM.

by JOAN CLAYBROOK
NATIONAL HWY. TRAFFIC SAFETY
ADMINISTRATION, WASHINGTON, D.C. 20590
1977; 13P
Availability: CORPORATE AUTHOR

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HS-803 282

SAFETY RELATED RECALL CAMPAIGNS FOR MOTOR VEHICLES AND MOTOR VEHICLE EQUIPMENT, INCLUDING TIRES, REPORTED TO THE NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION BY DOMESTIC AND FOREIGN VEHICLE MANUFACTURERS, JULY 1, 1977 TO SEPTEMBER 30, 1977

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AB VOLVO, S-405 08 GOTEBORG, SWEDEN

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AEROSPACE CORP., ENVIRONMENT AND ENERGY CONSERVATION DIV., EL SEGUNDO, CALIF. 90245

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ALUMINUM CO. OF AMERICA, ALCOA CENTER, PA. 15069

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ALUMINUM CO. OF CANADA

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MOTOR VEHICLE MANUFACTURERS ASSOC. OF THE UNITED STATES, INC., 320 NEW CENTER BLDG., DETROIT, MICH. 48202
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NATIONAL HWY. TRAFFIC SAFETY ADMINISTRATION; FEDERAL HWY. ADMINISTRATION, WASHINGTON, D.C. 20590
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NATIONAL HWY. TRAFFIC SAFETY ADMINISTRATION, OFFICE OF AUTOMOTIVE FUEL ECONOMY, 400 7TH ST., S.W., WASHINGTON, D.C. 20590
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NATIONAL HWY. TRAFFIC SAFETY ADMINISTRATION, SAFETY RES. LAB., 6501 LAFAYETTE AVE., BLDG. 2, RIVERDALE, MD. 20840
HS-803 234

NATIONAL HWY. TRAFFIC SAFETY ADMINISTRATION, TECHNICAL REFERENCE DIV., WASHINGTON, D.C. 20590
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NATIONAL HWY. TRAFFIC SAFETY ADMINISTRATION, TECHNICAL REFERENCE DIV., WASHINGTON, D.C. 20590
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NATIONAL HWY. TRAFFIC SAFETY ADMINISTRATION; TECHNICAL REFERENCE DIV., WASHINGTON, D.C. 20590
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NATIONAL SAFETY COUNCIL, COM. ON MOTOR VEHICLE TRAFFIC ACCIDENT CLASSIFICATION, 444 N. MICHIGAN AVE., CHICAGO, ILL. 60611
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TRANSPORTATION RES. BOARD, NATIONAL RES. COUNCIL, WASHINGTON, D.C. 20418
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TRANSPORTATION SYSTEMS CENTER, TECHNOLOGY SHARING PROG. OFFICE, KENDALL SQUARE, CODE 151, CAMBRIDGE, MASS. 02142
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TRANSPORTATION SYSTEMS CENTER, TECHNOLOGY SHARING PROG. OFFICE, KENDALL SQUARE, CODE 151, CAMBRIDGE, MASS. 02142
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UNION TECHNIQUE DE L'AUTOMOBILE DU MOTORCYCLE ET DU CYCLE, UTAC LABORATOIRE, AUTODROME DE LINAS - MONTLHERY, LINAS 91310 MONTLHERY, FRANCE
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UNIVERSITY OF BIRMINGHAM, UNITED KINGDOM
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UNIVERSITY OF SOUTHERN CALIFORNIA, INST. OF SAFETY AND SYSTEMS MANAGEMENT, LOS ANGELES, CALIF. 90007
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UNIVERSITY OF TECHNOLOGY, INST. FOR CONSUMER ERGONOMICS, UNITED KINGDOM
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DEPARTMENT OF MOTOR VEHICLES, OFFICE OF PROG. DEVEL. AND EVALUATION, P.O. BOX 1828, SACRAMENTO, CALIF. 95809
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BENDIX AUTOMOTIVE CONTROL SYSTEMS GROUP ENGINEERING; REPCO, PATONS BRAKE REPLACEMENTS DIV.
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BETHELEM STEEL CORP., RES. DEPT.
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CALIFORNIA INST. OF TECH., JET PROPULSION LAB., PASADENA, CALIF.
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CHRYSLER CORP.
HS-022 387

CHRYSLER CORP.
HS-022 493

DOT-FH-11-8279

PENNSYLVANIA STATE UNIV., PENNSYLVANIA TRANSPORTATION INST., UNIVERSITY PARK, PA. 16802
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PENNSYLVANIA STATE UNIV., PENNSYLVANIA TRANSPORTATION INST., UNIVERSITY PARK, PA. 16802
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DOT-FH-11-8510

TEXAS A AND M UNIV., TEXAS TRANSPORTATION INST., COLLEGE STATION, TEX.
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DOT-FH-11-8817

CANYON RES. GROUP, INC., 32107 LINDERO CANYON RD., SUITE 123, WESTLAKE VILLAGE, CALIF. 91361
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DOT-FH-11-9193

DYNAMIC SCIENCE, INC., 1850 W. PINNACLE PEAK RD., PHOENIX, ARIZ. 85047
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AEROSPACE CORP., ENVIRONMENT AND ENERGY CONSERVATION DIV., EL SEGUNDO, CALIF. 90245
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AEROSPACE CORP., ENVIRONMENT AND ENERGY CONSERVATION DIV., EL SEGUNDO, CALIF. 90245
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DOT-HS-343-3-682
STATE OF WASHINGTON DEPT. OF MOTOR VEHICLES, OLYMPIA, WASH. 98504
HS-803 216

DOT-HS-4-00904
BOOZ, ALLEN APPLIED RES., 4733 BETHESDA AVE., BETHESDA, MD. 20014
HS-803 254

DOT-HS-5-01121
NATIONAL COM. ON UNIFORM TRAFFIC LAWS AND ORDINANCES, SUITE 430, 1776 MASSACHUSETTS AVE., N.W., WASHINGTON, D.C. 20036
HS-803 160

DOT-HS-5-01180
FRANKLIN INST. RES. LABS., 20TH AND RACE STREETS, PHILADELPHIA, PA. 19103
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DOT-HS-5-01187
AMERICAN INSTITUTES FOR RES., 1055 THOMAS JEFFERSON ST., N.W., WASHINGTON, D.C. 20007
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DOT-HS-5-01192
WAYNE STATE UNIV., DEPT. OF INDUSTRIAL ENGINEERING AND OPERATIONS RES., 640 PUTNAM, DETROIT, MICH. 48202
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DOT-HS-5-01200
SYSTEMS TECHNOLOGY, INC., 13766 S. HAWTHORNE BLVD., HAWTHORNE, CALIF. 90250
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SYSTEMS TECHNOLOGY, INC., 13766 S. HAWTHORNE BLVD., HAWTHORNE, CALIF. 90250
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SYSTEMS TECHNOLOGY, INC., 13766 S. HAWTHORNE BLVD., HAWTHORNE, CALIF. 90250
HS-803 247

DOT-HS-5-01203
OHIO STATE UNIV., DEPT. OF INDUSTRIAL AND SYSTEMS ENGINEERING, COLUMBUS, OHIO 43210
HS-803 244

DOT-HS-5-01252
ARTHUR YOUNG AND CO., 1025 CONNECTICUT AVE., N.W., WASHINGTON, D.C. 20036
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DOT-HS-5-01275
INDIANA UNIV. SCHOOL OF PUBLIC AND ENVIRONMENTAL AFFAIRS, INST. FOR RES. IN PUBLIC SAFETY, BLOOMINGTON, IND. 47401
HS-803 260

DOT-HS-6-01286
UNIVERSITY OF MICHIGAN, HWY. SAFETY RES. INST., ANN ARBOR, MICH. 48109

DOT-HS-6-01337
INNOVATRIX, INC., BOX 371, INGOMAR, PA. 15127
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ARTHUR YOUNG AND CO., 1025 CONNECTICUT AVE., N.W., WASHINGTON, D.C. 20036
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ARTHUR YOUNG AND CO., 1025 CONNECTICUT AVE., N.W., WASHINGTON, D.C. 20036
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DOT-HS-6-01451
UNIVERSITY OF CALIFORNIA, SCHOOL OF ENGINEERING AND APPLIED SCIENCE, LOS ANGELES, CALIF. 90024
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DOT-HS-6-01457
BURLINGTON FLEET SERVICES, P.O. BOX 21207, GREENSBORO, N.C. 27420
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DOT-HS-6-01475
DUNLAP AND ASSOCIATES, INC., ONE PARKLAND DRIVE, DARIEN, CONN. 06820
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DOT-HS-7-01541
PLANNING AND HUMAN SYSTEMS, INC., 3301 NEW MEXICO AVE., N.W., WASHINGTON, D.C. 10016
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DOT-HS-7-01548
SYSTEMS TECHNOLOGY, INC., 13766 S. HAWTHORNE BLVD., HAWTHORNE, CALIF. 90250
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DOT-HS-7-01551
CALSPAN CORP., BUFFALO, N.Y. 14221
HS-803 282

DOT-HS-7-01642
RICHARD L. DEAL AND ASSOCIATES, INC., 10560 MAIN ST., FAIRFAX, VA. 22030
HS-803 268

DOT-TSC-1101
UNIVERSITY OF SOUTHAMPTON, INST. OF SOUND AND VIBRATION RES., SOUTHAMPTON, ENGLAND
HS-022 376

DOT-TSC-1160
AUTOMOBILE CLUB OF SOUTHERN CALIFORNIA, 2601 S. FIGUEROA ST., LOS ANGELES, CALIF. 90007
HS-022 355

ENERGY RES. AND DEVEL. ADMINISTRATION, BARTLESVILLE ENERGY RES. CENTER, BARTLESVILLE, OKLA.
HS-022 368

ERDA-AT-(29-1)-789
SANDIA LABS.
HS-022 499

FHWA-P.O.-6-3-0068
JOHNS HOPKINS UNIV., APPLIED PHYSICS LAB.,

F04701-76-C-0077
AEROSPACE CORP., ENVIRONMENT AND ENERGY CONSERVATION DIV., EL SEGUNDO, CALIF. 90245
HS-022 488
AEROSPACE CORP., ENVIRONMENT AND ENERGY CONSERVATION DIV., EL SEGUNDO, CALIF. 90245
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GENERAL MOTORS PROVING GROUND, SAFETY RES. AND DEVEL. LAB.
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GENERAL MOTORS RES. LABS., METALLURGY DEPT.
HS-022 372

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PURDUE UNIV., JOINT HWY. RES. PROJ., CIVIL ENGINEERING BLDG., WEST LAFAYETTE, IND. 47907
HS-022 436

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UNIVERSITY OF MICHIGAN, HWY. SAFETY RES. INST., ANN ARBOR, MICH. 48109
HS-022 483

IIT RES. INST.
HS-022 505
JACK E. LEISCH AND ASSOCIATES, EVANSTON, ILL.
HS-022 465
JACK E. LEISCH AND ASSOCIATES, EVANSTON, ILL.
HS-022 466
KAISER ALUMINUM AND CHEMICAL CORP.
HS-022 401

KYP-75-70
KENTUCKY DEPT. OF TRANSPORTATION, DIV. OF RES., 533 S. LIMESTONE, LEXINGTON, KY. 40508
HS-022 438

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KENTUCKY DEPT. FOR NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION, BUREAU OF NATURAL RESOURCE, CENTURY PLAZA, FRANKFORT, KY. 40601
HS-022 473

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MVI-75-001A
UNIVERSITY OF MICHIGAN, HWY. SAFETY RES. INST., ANN ARBOR, MICH. 48109
HS-022 484
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HS-022 377

NATIONAL STEEL CORP.
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STOCKTON POLICE DEPT., 22 E. MARKET ST., STOCKTON, CALIF. 95202
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CENTER FOR THE ENVIRONMENT AND MAN, INC., 275 WINDSOR ST., HARTFORD, CONN. 06120
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UNIVERSITY OF MICHIGAN, HWY. SAFETY RES. INST., HURON PKWY. AND BAXTER RD., ANN ARBOR, MICH. 48109
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SOUTHWEST RES. INST., SAN ANTONIO, TEX.
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SYSTEMS TECHNOLOGY, INC.
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UNIVERSITY OF NORTH CAROLINA, HWY. SAFETY RES. CENTER, CHAPEL HILL, N.C.
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UNIVERSITY OF NORTH CAROLINA, HWY. SAFETY RES. CENTER, CHAPEL HILL, N.C.

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SAE-770167	HS-022 244
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SAE-770176	HS-022 384
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